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EDITORIAL.

Colonization of new Rice-Growing Areas

Information has been given, from time to time, in the pages of this Journal, on the development of new areas and the improvement of existing areas of rice land. These accounts have dealt mainly with the engineering problems involved and in the establishment of varieties of padi suitable for the local conditions. Little has been said regarding the equally important subject of colonization and administration. These aspects, however, have not been overlooked as it has been realized that neglect of them would nullify the time and money spent on development work. Land Officers have followed the development of schemes very closely, and have not only facilitated the progress of the work of the technical departments, but have taken early steps to organize the village life.

Included in this number is an account of the Sungei Manik Irrigation Scheme, by Mr. de Moubray, who, as District Officer, Lower Perak, is responsible for the administration involved. In addition to giving a brief account of the irrigation scheme, the author describes the methods which he has adopted as the scheme developed, in dealing with the colonization of the area. In the absence of pressure of population in most Malay districts it is no easy matter to induce the right type of Malay to move his habitation and to adapt himself to the different conditions of life which are inseparable with the development of newly-opened areas, but Mr. de Moubray is hopeful of success in this direction.

The measure of success which has already crowned Mr. de Moubray's efforts is encouraging, and the fact that he advances his plans with caution undoubtedly enables him to avoid the many unforseen pitfalls which might not only result in hardship to the settlers, but which would almost certainly prejudice the future development of the area.

The object of the development of new areas under padi must not be the mere transfer of the agricultural population from one part of the country to another, but, as the author states, to make available plots of land of a size sufficiently large to ensure an exportable surplus and a certain livelihood for the settlers. The encouraging results of the crops obtained at Sungei Manik lead to the conclusion that the object will be attained, and this irrigation scheme prove a real contribution towards rendering Malaya more independent of imports of rice to satisfy local demands.

Copra Kilns for Small Estates.

Many of the improved kilns of permanent construction originally recommended for use by small-holders have been erected and are being operated successfully in various parts of the country. These kilns were primarily designed for use by co-operative societies and large-scale producers and were not suitable for the individual small-holder who required a kiln of a size suitable only for his own crop. Thus the owner of a small area of coconuts has awaited the introduction of a small kiln which combines cheapness with efficiency.

A solution to this problem has now been found, and the article in this number, written by the Officer-in-Charge of Copra Investigations, is a contribution of great value to the industry. The two kilns which he here describes are designed to deal with a 10 acre and a 30 acre holding of coconuts. They both combine cheapness of construction with rapid drying. Necessarily cheapness will appeal to the small-holder, while rapid drying ensures a high-grade product without the attendant risk of interrupted drying (resulting in a bad product) which is always possible with slow drying. Whereas on the Ceylon type of kiln in general use, three to four days are required for drying, in the new design the drying operation is completed in 30 hours.

In view of the fact that many small-holders confine copra production to a few days in the month, employing the remaining days for other business, it is recommended that when possible the "30 acre" kiln should be used.

While these kilns are especially designed for small-holders they will be found of equal use under certain circumstances on the larger estates, in particular to cope with the crop from isolated areas, when the cost of transport of nuts to the central factory is prohibitive, and also for the treatment of nuts from young areas before the erection of a large kiln is justified by the crop.

The Agricultural Trade of Malaya.

One of the most encouraging features of the agricultural trade of Malaya in 1935, which forms the subject of an article in this number, is the marked increase in net exports. The figures indicate the steady development of estates during the past few years, a development not only of area planted, but in methods of cultivation resulting in greater efficiency and heavier crops.

The exports of oil palm products exhibit a natural expansion due to an increased area reaching the bearing stage. A steady increase may be expected for some years to come.

Copra and coconut oil production has exceeded expectations. The new record for high production may be due to favourable climatic conditions, to the fact that many new areas of coconut small holdings have come into bearing, and also to the increased attention given to water control.

In contrast to the former system of interplanting pineapples with rubber, two-thirds of the area under pineapples is now treated as a sole crop. This may well be a contributing factor for the increased production of canned pineapples.

Improved methods of cultivation now receiving consideration are likely to result in still greater crops in the future.

By reason of the low prices ruling in 1935, producers did not reap the full advantage of the increase of production. If indeed the world is now emerging from the acute trade depression, Malaya will find itself better equipped than hitherto to take advantage of the improved conditions, while the steady advance that has been made regarding quality will commend Malayan produce on the world markets.

Original Articles.

THE SUNGEI MANIK IRRIGATION SCHEME

BY

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History.

The Sungei Manik Irrigation Scheme takes its name from the Sungei Manik, a tidal creek of the Perak River and a flood channel of the Batang Padang River.

Rice was first cultivated on the banks of the Sungei Manik in 1916. In 1922 and 1923 the part of the stream in the cultivated area was canalized, and this canalization was extended later towards the Batang Padang Mati, one of the network of overflow channels of the Batang Padang. The rice fields depended at first on rain water supplemented by floods and high tides banking up the Sungei Manik from the Perak River. In about 1928 a water gate was constructed for the purpose of trapping and retaining this water. A brushwood dam across the Batang Padang Mati was at one time used further to supplement the supply.

In 1931, when 1,249 acres had been alienated and about 800 acres cultivated, plans for the "First Stage" of the irrigation scheme were drawn up by the present Adviser on Drainage and Irrigation. Work started late in the following year, having been much delayed by the Retrenchment Commission. An intake was constructed on the Batang Padang Mati capable of commanding the First Stage. There was a further delay owing to uncertainty as to whether powers should be taken to compel land-owners to construct the minor distributary channels. In 1934 it was decided that they should be constructed by Government, and in October 1934 water was first supplied by their means.

Expediency was not the ground for this decision and it now seems most fortunate that distributaries are being constructed by the Government. The conversion of four or more acres of virgin jungle into rice-land is in itself a sufficient strain on settlers, and a drain on their financial resources, for while waiting for the burn they must earn enough to keep themselves in food. Furthermore, gaps would almost certainly have been left in constructional work which would have cut off the supply of irrigation water to fields further down the line. It is also most unlikely that the grading of distributaries would have been as satisfactory as it now is, the method of their construction being quite new to Malays, for they are built above the surrounding land, the bottom of the channel being at ground level.

General Characteristics.

The scheme is in many respects unique. Large parts of the area were at one time permanently many feet under water, the Batang Padang River overflowing its banks and the flood-water flowing off in a network of subsidiary streams. The

first necessity, therefore, was the dredging and bunding of the Batang Padang River. Controlled drainage and irrigation have had to come later except in and around the very restricted area already under cultivation. During the wetter months one can now walk along several miles of the Batang Padang bund with at least four feet of water on one side and dry ground on the other.

As a large-scale irrigation scheme it is also unique in that it is being carried out in dense virgin jungle. This virgin jungle is a source of the following three difficulties:—

(*a*) Obtaining full and accurate topographical information. For instance, in an area which was considered adequately explored, three old channels of the Batang Padang River have recently been discovered.

(*b*) The physical resistance this forest offers to effective development.

(*c*) The cost of maintenance—owing to rapid deterioration—of irrigation channels constructed ahead of agricultural development.

The scheme area occupies roughly 30,000 acres, of which probably 23,000 acres net will be available for padi fields. The topographical information possessed with regard to two-thirds of the area is still insufficiently complete for it to be possible to plan the whole area. This is one of the principal reasons why the unique course was adopted of constructing a major irrigation work in progressive stages starting with a temporary intake situated at the bottom end of the scheme area and capable of irrigating only a small fraction thereof. Other reasons were that the work was started in the depths of the slump; that only 800 acres were under cultivation in 1931; that this area was the furthest away from the future permanent intake; and, lastly, that the area is difficult of access.

Development in Progressive Stages.

In 1935 the Batang Padang Bund was completed. This bund prevents the Batang Padang River from overflowing into the scheme area; but it has also had the effect of cutting off the supply of water to the intake on the Batang Padang Mati. During the last irrigation season it has therefore been necessary to connect this old intake to a temporary intake on the main stream of the Batang Padang River by means of a short canal through the bund and a minor tributary of the Batang Padang Mati. At the time of writing the ends of this canal have already been sealed and the breach in the bund repaired, and a more permanent intake higher up the Batang Padang, with a canal system to feed the "Second Stage" (2,500 acres) and the "First Stage" intake (which will then be a control gate), is approaching completion. According to present proposals, the permanent barrage across the Batang Padang River will be started in 1938, ready for the 1939-1940 padi season.

Considerable ingenuity is being shewn in fitting these instalments of the scheme into the general scheme as it evolves. In many cases existing streams are being used first for the purpose of irrigation and later for that of drainage. This is the first large irrigation scheme in this country so designed that the final plans for

each stage shew complete and distinct systems of irrigation and drainage, permitting the drift of water across every rice field in the area, thus providing the best conditions for a good padi crop.

Colonization.

The following table shews the development of the colonization of the area.

Year	Area Alienated		Area Planted	Area Abandoned	Area Alienated not yet Felled
	Each Year	Total			
Prior to 1932		1,249		50 ?	
1932		1,249	1,030	50 ?	169
1933	1,518	2,767	1,500	50 ?	1,217
1934	670	3,437	1,947	421	1,069
1935	971	4,007	2,820	421	414

The figures shew that there was a check in development in the 1933-34 season, the indications being the heavy drop in the area alienated in 1934 and the increase in the area abandoned. Local opinion agrees that the main cause was extensive damage in the newly alienated area by a herd of probably 24 elephants, which resulted in the abandonment of most of the land newly alienated and the complete disappearance of the registered owners. A subsidiary cause is believed to have been the difficulty of access to this new area. It is not thought that the competition of rising prices for other crops exercised any appreciable influence towards the abandonment, for up to that time the settlers had been drawn almost exclusively from among coconut planters, and the price of copra was then at its lowest point.

It will be seen that there has been an appreciable recovery in 1935 in the area alienated, in that planted, and in the area of unfelled jungle. By December 1935 fresh applications had been received, and were under consideration, for about 2,500 acres of land.

Elephant Control.

Attempts to control the movements of the elephants were inaugurated in 1934, but in April 1935 were admitted to be a failure. Orders were then given to drive the elephants across the Kinta or Perak Rivers, and, if they broke back, to shoot them. Fourteen elephants have now been shot and damage has, at least temporarily, ceased.

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By courtesy of the Drainage & Irrigation Dept.

By courtesy of the Drainage & Irrigation Dept.

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Improvement of Means of Communication.

Early this year a bridle path was made from the railway line two miles into the area by widening one of the bunds of a distributary. A 3½ mile bridle path into the area from Teluk Anson was planned in 1935 and provision for its construction and for the acquisition of the necessary land was entered in the 1936 estimates. In the middle of October funds were found to be available for immediate acquisition. The Land Office was able to peg out and to complete the negotiations for acquiring a strip of land nearly three miles long through small holdings within the two months at its disposal. Construction is about to start. This bridle path will be unique in Malaya in incorporating an asphalted all-weather cycling track. An access road will eventually follow the line.

The construction of a bridle path into the area from Sungei Tukang Sidin Station was started in December 1935. Traces have been decided upon for bridle paths from the old Chikus Railway Halt and from Degong Railway Station. It was proposed to start work on these in January 1936. As an experiment, arrangements were made for trains to stop at the old Chikus Halt from January 1936.

It is expected that the most popular means of transport of padi will be by water to the mill at Teluk Anson, and with this in view it is proposed to improve the numerous rivers within, and bordering on the scheme area. A mill site and sites for buying agencies have been selected on these rivers.

Increasing Applications for Land.

The critical date for the Sungei Manik Scheme was that of the first harvest after irrigation, namely March 1935. For some time previously the scheme had been losing in popularity. Two factors, however, contributed to a change in attitude, (*a*) that it was obvious that something was being done about elephants, and (*b*) the satisfactory harvest. Test cuttings on five lots in the 1916 to 1931 alienations shewed an average yield of 468 gantangs an acre. This was probably higher than the true average, but the cultivators feel confident of even higher yields. It is probable that the decision that Government should construct the distributaries, and the mere fact of seeing water flowing in them, added to the effect.

Another aspect of the high yields is that there was an exportable surplus of padi. It is not known how great it was, but when the Sungei Manik control gate was closed in the middle of June there were immediate petitions from men who were still exporting padi.

Applications, which had decreased in number very considerably during the latter half of 1935, began to flow in again. Most of the applicants only intended entering into occupation in 1936, although many of them were induced to do so at an earlier date. They were, however, too late for the 1935 planting season. Their attempts to plant in 1935, as can be seen from the accompanying aerial photographs, resulted in a bad burn, due to the felled trees not being allowed sufficient time to dry before being burnt, and in patches of forest being left unfelled. Last moment applications for land were also responsible for a bad burn in 1934.

The appointment of a Colonization Officer, which was at one time fixed for 1936, was put forward to October 1935 in order to endeavour to advance the annual alienation season.

The colonization methods in the Punjab are largely being taken as a model. These methods include propaganda, severe selection among applicants, and the grouping, in the colony, of families who come from the same locality in daughter colonies.

Careful selection is more necessary now than in the earlier stages, as the accepted policy is to increase the size of holdings of rice land in order to ensure both a bigger exportable surplus of padi, and a more certain livelihood for the settlers.

The policy has now been adopted of not restricting alienation to standard lots, but of placing families into occupation of the largest area it is believed they can cope with. For this reason, late in 1934, the Perak Drainage and Irrigation Board adopted the policy of "post survey", that is, of placing settlers into occupation of land under temporary license according to their estimated capacity, and of surveying and issuing titles later, according to effective occupation. The first systematic alienation under temporary license in Sungei Manik is about to start, and much is hoped from it, particularly in connexion with experiments with Perak Malays.

It is for the purpose primarily of carrying out this work that the Colonization Officer was appointed.

It has been ascertained that all land in the Panchang Bedena rice area in Selangor is "alienated" under temporary license, and that this allows of far more effective weeding out of undesirable colonists.

Propaganda and Recruiting.

The Colonization Officer started propaganda tours on the 15th November, 1935, with the enthusiastic help, in the Kuala Kangsar District, of the Datoh Stia. The results have been most instructive. There are definitely areas in which there is much keenness, other areas in which there is moderate interest, and again areas in which there is no interest at all. In those areas in which there is keenness there are marked indications of a land shortage or of very depressed economic conditions.

In December 1935, at a time of year when applications are usually low, there were 414 applications for approximately 2,500 acres (285 of the applications being from Perak Malays, 129 from foreign Malays). The Colonization Officer has been, however, under instructions to select with rigour, particularly in the case of Perak Malays. A large batch of Perak Malays from Bandar will probably only be considered in 1937, when I hope it will be possible to settle them in a part of the area still in their own mukim, about the last part of the area to be irrigated, and where controlled drainage will permit of an experiment which will

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By courtesy of the Drainage & Irrigation Dept.

do no great harm if it is unsuccessful. By March 1936, at the time of writing, colonists have been placed in occupation of just under 2,000 acres and felling has started.

Additional Sources of Income.

I am anxious to ensure that the settlers should not have to depend exclusively on padi.

In Krian a small air-breathing fish introduced from Siam (*Sepat Siam*), which breeds in profusion in the flooded rice fields and survives the dry season in pits, besides providing food, provides an additional source of cash income of about $10 per acre for the rice fields in which it is reared. Fry of this fish were introduced into Sungei Manik at the end of 1934, and a further consignment in 1935.

This fish has already provided food in plenty. It is most satisfactory to be able to record that when the water was drawn off the rice fields a Chinese dealer in Tapah Road established an agent at Sungei Manik and that there was a considerable trade in live fish.

The discovery (from the European point of view) has recently been made that Malayan carp can breed in ponds. The fish in question are kalui (*Osphromenus*), terbol (*Osteochilus*), tembakang (*Pristolepis*), and lampam (of which I do not know the scientific name). It is certain that there will be a ready market for kalui among Straits-born Chinese, as they are very similar to Chinese carp, with the advantage, however, of fewer bones, and it is very likely that the other varieties will also become popular. It is scarcely necessary to say that these fish are relished by Malays (I have found tembakang very appetising). The Officer-in-Charge, Fisheries Department, visited Sungei Manik recently at my request, and has selected a borrow pit which he proposes to stock with carp and to use as an experimental pond in order to ascertain whether these carp will breed under the special conditions of a rice-growing area. This pond will be under the charge of the Colonization Officer, who has previous experience in the breeding of Malayan carp. If the experiment is successful it will probably devolve on the Colonization Officer to organize Co-operative Societies to construct and maintain similar ponds.

It would seem necessary to explore the possibilities of Cottage Industries, particularly as a means of filling the time of rice cultivators during the off-season. Partly in order to make a start in this direction, I have arranged for the present rice cultivators to build a school and master's house in the middle of the rice area. The school has been opened and the Inspector of Schools has supplied a teacher specially selected for his work at crafts and cottage industries at the Sultan Idris Training College.

Regional Planning.

No dry land was provided for the earliest three-acre rice fields. In the next series of alienations half an acre in each four-acre lot was set apart for homesteads. Photograph S.32 shews the lines of houses arranged in these half-acre plots along distributaries. It was found, however, that these areas could not be kept sufficiently

dry for the cultivation of the more important fruit trees. The next step was to segregate the homestead areas entirely from rice-growing areas in the shape of ribbons. Photographs I.21 and S.29 shew such a ribbon between the Batang Padang bund and an irrigation channel. This is an area to be alienated this year. For the next stage, plans are being made for still more compact homestead areas. Village sites, firewood reserves, and through lines of communication are also being planned.

A padi experimental station has been started, and a site is now being selected for a fruit tree nursery for supplying the village areas with the highest quality of grafts. In the meantime, grafts will be supplied from other sources.

Administration.

The Drainage and Irrigation Engineer has recently been appointed Officer-in-Charge under the Irrigation Areas Enactment.

An Advisory Committee has yet more recently been appointed to co-ordinate the efforts of all officers stationed in Lower Perak directly interested in the scheme, to report on and to make recommendations concerning more important matters to the Perak Drainage and Irrigation Board, and, eventually, to exercise certain statutory powers.

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COPRA MANUFACTURE

BY
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Introduction.

This is the first of a series of three articles dealing with the preparation of copra in kilns in which the copra is heated directly by the hot gases of burning coconut shells. These kilns are known popularly as "smoke" driers though this name is a misnomer when applied to the improved type, capable of producing a superior grade of crisp, white copra. The term is more correctly applied to primitive kilns in which broken shell, husk, and often wood are used as fuel and from which a very inferior, heavily-smoked product is obtained*.

In the present article an account is given of two inexpensive kilns designed for use on small holdings of between 1 and 30 acres. In Part II details will be given of kilns of intermediate size suitable for trader-manufacturers and also for use on very small coconut estates and in areas of immature coconuts on large estates. In Part III an account will be given of recent investigations regarding the design and operation of large smoke kilns as used on European estates.

In order to distinguish the various kilns, a special nomenclature has been adopted and they are designated variously as "10 acre", "30 acre", "50 acre", "100 acre", 150 acre", "250 acre", "500 acre" and "750 acre" kilns. Such descriptive names are intended to indicate approximately the maximum acreage of mature coconuts each kiln is designed to serve, if allowance is made for crop fluctuations, kiln repairs, holidays and other factors.

Until recently a somewhat expensive kiln of intermediate size and of permanent construction has been recommended for use either by Malay trader-manufacturers who purchase nuts from the owners of small properties, or by co-operative societies composed of coconut small-holders. Although 33 kilns of this approved pattern have been built in various part of the country there are signs that progress in this direction is definitely limited, owing to the fact that the large army of small-property owners who have enthusiastically taken up the production of copra, following the advice of officers of the Department of Agriculture, have generally preferred to work individually rather than co-operatively.

As a result, innumerable kilns of crude, impermanent and unsatisfactory design have also been built in recent years as every small-holder could not afford to build an expensive approved kiln for his own use. As a natural corollary also, Chinese methods of production have been followed and a discoloured under-dried product has generally been obtained. It is to meet the requirements of such people that the "10 acre" and "30 acre" kilns have been devised.

* The Coconut Industry of the Philippine Islands by F. C. Cooke, Bulletin No. 23 of the Department of Agriculture, S.S. & F.M.S., pages 34 to 42. Also *Malayan Agricultural Journal* Vol. XXIV No. 3, page 135. H. T. Pagden.

An additional complication which has recently become apparent is that, in certain Malay reserves, copra making must necessarily be restricted to a few days in every month since the peasant has numerous other occupations such as *attap*-making, fishing, rubber tapping, rice growing, vegetable cultivation and general labour, from which he obtains important additional sources of income. Consequently, since his kiln cannot be in regular use, it must be of larger capacity than the size of his holding apparently justifies. Thus, for 5 acres of coconuts a "10 acre" kiln is inadequate, and a "30 acre" kiln must be recommended; the "10 acre" kiln in similar circumstances is suitable for small holdings of 2 or 3 acres.

Part I.

SMALL COPRA KILNS.

The "10 Acre" Kiln.

This miniature kiln, which is designed for use on small-holdings varying in size between 1 and 10 acres, is able to dry 100 coconuts and yield crisp, white, undistorted and uniformly dried copra in 15 hours.

It may be recalled that, at one time, considerable stress was laid on the belief, emanating from Ceylon, that copra must be dried slowly, and that a minimum of three days and preferably four days must be occupied in driving off the moisture if a satisfactory product is to be obtained*.

It is still quite correct that drying on the Ceylon type of smoke kiln cannot be forced unduly as, owing to the large pit, local concentrations of heat occur and drying is by no means uniform. If drying is accelerated by the use of additional fires, the hot zones will become more pronounced and some of the copra will be scorched, case-hardened and distorted, while the remainder will remain under-dried.

Recent investigations have shown that in such kilns only a certain quantity of the copra on the platform is being heated at a time, and that, if all the copra could be continuously and uniformly heated, a dry product could be obtained four or five times as quickly.

In this new small kiln high speed production can be effected with safety, and, furthermore, since the whole of the copra is continuously hot, there is no danger of spoilage through the chilling which may occur in larger kilns under wet-weather conditions of production. The principal problem on this smaller kiln has been to reduce the heat sufficiently and satisfactorily for such a small number of nuts, since at first it was found that the copra was either scorched through general overheating or oversmoked through restricting the combustion of the shell fuel in order to reduce the heat. The details given below must be carefully followed if satisfactory results are to be obtained.

General Arrangement.—High ground is selected for the site of the kiln which is a rectangular wooden chamber 6 feet high, the base being 3 feet square and the top open. A tunnel leads into the base of this chamber and forms the

* Coconuts and Coconut Products, by F. C. Cooke—Bulletin No. 8, Department of Agriculture, S.S. & F.M.S., page 28.

THE "10 ACRE" KILN.

hearth in which a single chain of coconut shells is burnt continuously. The overall area covered by the chamber and tunnel is 7 feet x 3 feet; this is sheltered by an *attap* roof.

The Chamber.—The copra is dried on a platform of spaced nibong slats, covered with chicken wire, and arranged horizontally within the chamber, 5 feet above ground level. Some 3 inches beneath this platform there is a heat-spreader consisting of a piece of perforated sheet iron, 2 feet 9 inches square, which is supported horizontally by wire. This piece of iron is perforated with 36 holes, each 2 inches square and arranged at 5 inch centres.

The base of the chamber is filled to a height of 18 inches with rammed clay leaving a hole in the centre 1 foot square which is lined with loose bricks, and through which the hot gases emerge from the tunnel.

A drop shutter is provided at the top of the chamber so that the copra may be easily inserted or removed and the heat-spreader may be cleaned when necessary. There is also an inspection door 18 inches above ground level for cleaning the clay base of the chamber.

The Fire Tunnel.—This consists of two walls of loose bricks laid along the ground and leading into the base of the chamber. These rows are each 6 bricks high, are laid 1 foot apart, and are covered by a stout sheet of iron, 6 feet long and 18 inches wide, anchored in position by bricks, laid along the edges, and by rammed clay where it joins the base of the kiln. The bottom line of bricks is spaced so as to allow air to filter to the fire.

Operation.—Good copra can only be obtained if the copra grill is loaded with freshly split nuts. If the nuts are split in the field, heat must be applied within six hours or else deterioration sets in.

Clean dry coconut shells of even size are inter-locked and laid loosely in a single line on a sheet iron tray, 5 feet long and 8 inches wide, outside the kiln. The hollow end of the row is lit using scrap rubber or kerosene to assist combustion. When the shells are well alight and burning without smoke, the tray is slid as far as it will go into the tunnel, the burning end entering first. Thus the shells burn from the centre outwards against the incoming current of air. This keeps the flame small and reduces the rate of combustion.* If the shells are burnt in the opposite direction, the draught would cause them all to ignite simultaneously so spoiling the copra and possibly also destroying the kiln. It should be noted that if the tunnel is too small in cross section, the induced draught is so great that the fires burn with difficulty and give a smoky flame.

When the fire is nearly out and is beginning to smoke, the tray is withdrawn and reloaded with a fresh supply of shell fuel, and just before this second fire is finished, the copra is turned over. Subsequently three further fires are lit in succession until the copra is dry and ready for shelling.

Efficiency.—A single line of shell, five feet long, is made up of about 40 pieces of shell (halves) and lasts about 3 hours. A total of 200 pieces is thus used, so that all the shells obtained from one lot of copra are consumed in the subsequent

* This method of burning shell fuel was first used in this country by Mr. D. Graham of Teluk Anson.

run. It follows that, with such rapid drying, the heat efficiency of the kiln tends to be low but this does not matter so long as sufficient fuel is produced to meet the requirements of firing.

The drying time is remarkably short and although, when in operation, the fires need fairly frequent attention, intervals may safely be left between fires, when the copra is nearly dry, without deterioration occurring. Once a supply of dry shell fuel is available and the kiln and ground have dried out, copra of estate quality should be obtainable, irrespective of weather conditions.

Life and Capital.—Properly operated there is little fire risk and, if the poles and woodwork are initially and periodically treated with creosote, a 'life' of over 2 years may safely be anticipated, the *attaps* being renewed yearly.

In a year of 150 working days the "10 acre" kiln, costing the small-holder less than $10 to build will produce 60 piculs of copra; thus the capital cost of the kiln spread over two years is equivalent to 8 cents per picul, or $1 per acre for a 10 acre holding yielding 6 piculs of copra per acre.

When the use of the kiln is shared between two or more small-holders the rent payable to the owner of the kiln should not be less than the rate shewn above.

The "10 Acre" Kiln.

(100 nuts dried in 15 hours)

Cost of Materials and Labour.

Amount.	Materials.	Size.		Approx. Cost. $
100	Bricks		...	1.40
12	Jelutong planks	16 ft. x 7 in. x ½ in.	...	2.40
1 piece	Iron sheet	5 ft. x 1 ft. 6 in x 1/32 in.	...	1.20
2 pieces	Galvanized iron, flat.	One 5 ft. x 1 in.; One 2 ft. 9 in. x 2 ft. 9 in.		1.00
	Nibong Slats		...	0.10
3	Broties	16 ft. x 2 in x 2 in.	...	0.66
50	*Attaps*	6 ft.	...	0.50
4	Poles	8 ft.	...	0.36
	Creosote		...	0.20
4	Hinges	4 in.	...	0.20
1 bundle	Rotan fibre		...	0.10
1 kati	Nails	Various	...	0.08
		Cost of materials	...	8.20
		Transport of materials (say)	...	1.00
		Labour, one day	...	0.80
		Total	...	$10.00

Notes on Materials.

Item.	Required for:-	Remarks.
Bricks	The sides of the fire tunnel	Old bricks quite suitable
Planks	The sides of the chamber	New planks must be sun-dried before use. Thicker planks may be used.
Iron sheet	The top of the fire tunnel	A thick sheet is essential.
Galvanized iron	(1) Tray for shells (2) Heat-spreader	Old sheeting quite suitable. " "
Nibong slats	Copra platform	The spaced slats may be covered with fine chicken wire, 3 ft. x 3 ft.
Broties	To support the planks	Jungle poles may be used instead.
Attaps	The roof	Lay close and tie securely.
Poles	The roof	
Hinges	The copra door and inspection hole.	

The "30 acre" Kiln.

Recent investigations have shown that when a shell fire is burning in the firepit of a Ceylon kiln, the hot air does not spread out under the copra and heat the whole of the material more or less uniformly. Instead, the currents of hot air pass almost straight up from the fire through the copra, such movement being confined within a narrow inverted cone having the fire point for its apex.

With a fire pit 6 feet deep, the effective hot zone in a bed of copra is a circle about 4 feet in diameter immediately over each fire and, outside this zone, the copra may still be warm if the fire has already passed, or cold if it is has not. Actually it has been found that, in the cold zones, air passes down through the copra to the fires. Thus, in a Ceylon kiln, possibly only a quarter of the copra is being heated at any particular instant so it will be readily understood why in this type of kiln, drying is so slow. Theoretically, therefore, by trebling the number of fire points it should be possible to obtain dry copra in 24 hours instead of the minimum of three days normally required. If this were done, however, the kiln would be liable to destruction by fire owing to local concentration of heat in the large fire pit.

Conversely, it should be possible to isolate over a single short chain fire a very small section of kiln, 6 feet long by 4 feet wide, so that the small quantity of copra on the platform is continuously heated and drying is thereby accelerated without the fire risk which is attendant on the use of an increased number of fires in a full-sized kiln. In effect, while such a miniature kiln would represent the fiftieth part of a Ceylon kiln in size it would actually be able to handle about one-twentieth the quantity of copra owing to the accelerated drying.

Description of the "30 acre" kiln.

General Arrangement.—The "30 acre" kiln is a closed *attap*-roofed, plank building 12 feet high covering an area 10 feet by 5 feet. The copra platform is 6 feet long and 4 feet wide, arranged 6 feet above ground level. The firepit below is made 4 feet longer than the copra platform by means of two extensions so as to permit of a long chain of shells being used, thereby reducing the frequency with which the fires require renewal. High ground should be selected for the site of the kiln.

The Fire Pit.—This is a closed chamber of weather-boarded planking with two small doors, one at each end of the long side of the kiln. This allows the fireman to lay fresh shells at one end of the kiln while a fire is still burning at the other.

The planks for the walls should be well dried before use. No special ventilation need be provided since the air necessary for combustion will filter in between the boards; there should, however, be no large holes through which strong gusts of wind may enter, as the fires would be disturbed and the efficiency of the kiln would be impaired.

The Copra Platform.—This is a large box closed on four sides with weather-boarding; the top is open, and the bottom consists of a grill of spaced nibong slats or expanded metal overlaid with close mesh chicken wire. There is a pair of double doors on one side through which the split coconuts are inserted and the dry copra is removed.

The Roof.—The open top of the kiln is covered with an *attap* roof overhanging 9 inches all round, leaving a gap at the eaves of 9 inches to permit humid air to escape from the kiln.

The two sloping roofs of the extensions of the firepit consist of flattened galvanized iron which is covered with *attap* in order to reduce the loss of heat by radiation. This *attap* should not be laid closely on the zinc or it will crumble away through heat.

Operation.—The split coconuts are thrown on the grill without any special arrangement, though the top nuts are all turned face downwards. A chain of coconut shells 8 feet long is laid between two parallel lines of loose serrated brickwork. The shells used should be clean, dry and of even size, and should not be packed too tightly. The fire channel should be carefully covered with sacking whenever copra is being removed or split nuts are inserted. This is to catch husk and broken pieces of coconut meat which produce smoke.

A double line of shells is used for the first fire irrespective of whether the copra has been sun-dried or not; subsequently, single lines of shells are used successively, the copra being turned over after the second fire is out. In order to prevent the smoking which normally occurs when shell fires are first started, a few shells are ignited outside the kiln on a sheet-iron tray and, when ready, this tray is brought in and placed at the start of the line of shells.

COPRA KILNS.

(*Left*) The "30 acre" Kiln. (*Right*) The "10 acre" Kiln.

Once a line of shells has been lit, it has been found that the fire requires no further attention as, owing to the heat reflected from the hot brickwork, the shells are pre-heated and dried before the fire reaches them. Thus a strong smokeless flame is assured and the fire progresses along the line steadily and uninterruptedly to its finish.

As a result, the attendant, after arranging and lighting a fire, may attend to other work; he may also safely retire to bed leaving a fire burning.

Efficiency.—A double line of shells about 8 feet long is made up of about 150 pieces of shell (halves) and lasts about 3½ hours. A single line of shells consists of about 70 pieces of shell and lasts 4 hours.

If the copra has not been sundried a total of about 500 pieces of half shell are required to dry 300 nuts. If the copra has been sundried before kiln-drying, one fire must be omitted and thus only 430 pieces of half-shell are used. Thus a surplus of shell is obtained with this kiln which is not the case with the "10 acre" kiln.

The kiln can, of course, be used to dry as little as 250 nuts, in which case the whole of the shells obtained from one charge are used for firing the next charge. Conversely, the heat efficiency is further improved if 400 nuts are dried but the copra obtained is rather more smoked and may also be scorched.

It is reported that a kiln of this type with a grill 8 feet long and 4 feet wide has been employed successfully to deal with lots of 600 nuts each, obtained from 90 acres of immature coconuts—an isolated area of a large coconut estate.

The drying time is very short and if the split nuts have been sundried effectively before insertion, dry copra can be removed in 24 hours. Allowing for intervals between the fires and for a full night's rest for the attendant, dry copra, without previous sundrying, can be obtained in 30 hours overall time.

It must be noted that the fires may not burn too well during the opening two runs when the kiln is cold and damp and that, as a result, the copra will take somewhat longer to dry and be somewhat smoky. Subsequently, when drier shells are available and the kiln and ground have dried out, copra of superior quality is obtainable in the time stated.

Life and Capital Cost.—In spite of the combustible nature of the materials of construction, it has been found that the fire risk is negligible. The original demonstration kiln has now been in regular operation in an exposed position for four months including a stormy period when superior copra was obtained without any change in procedure.

If the woodwork is carefully treated with creosote a 'life' of 2 years may safely be anticipated.

In a working year such a kiln will produce about 200 piculs of copra. If a small-holder owning 30 acres of coconuts does his own work and uses jungle materials wherever possible, he should be able to build the kiln for $15 and, therefore, the capital cost of the kiln spread over two years is equivalent only to 4 cents per picul or 50 cents per acre. Thus the rent for the use of such a kiln by a neighbour would be half that chargeable for the "10 acre" kiln.

"30 Acre" Kiln.

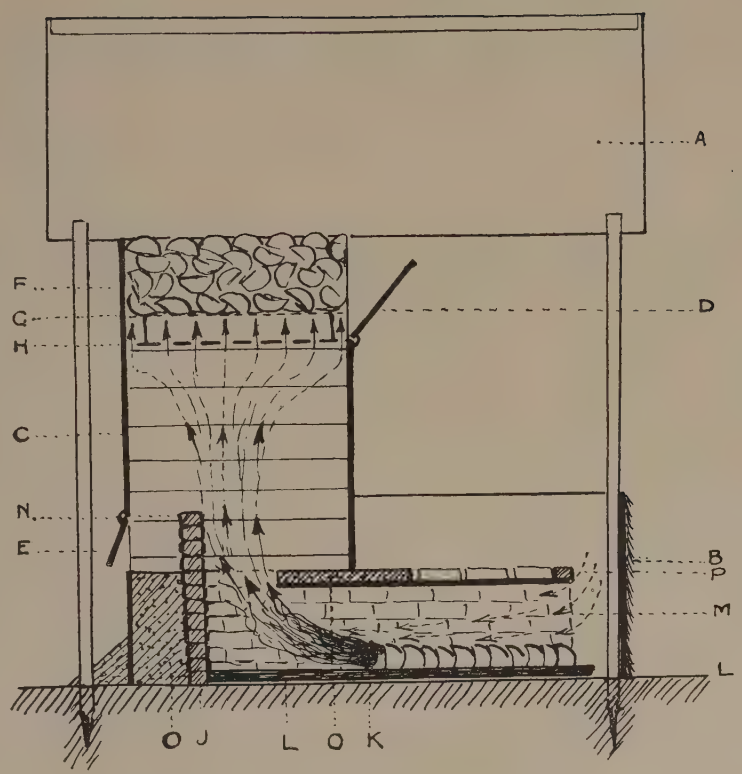
(300 nuts dried in 27 hours)

Cost of Materials and Labour.

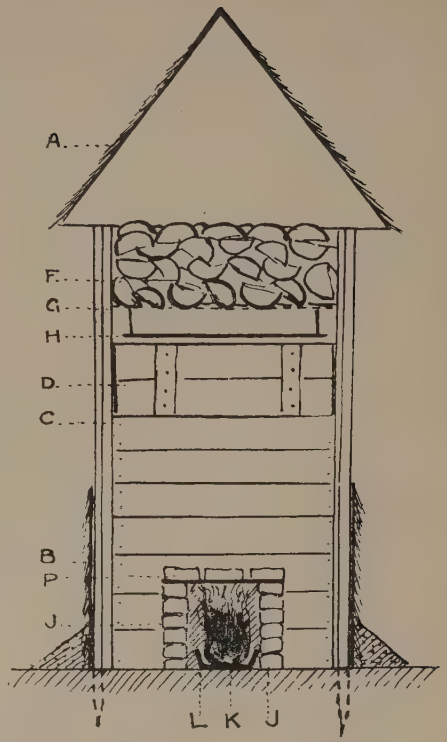
Amount.	Materials.	Size.		Approx. Cost. $
28	Meranti planks	16 ft. x 7 in. x 5/8 in.	...	7.00
2 sheets	Galvanized iron flat	3 ft. 6 in. x 3 ft.	...	1.00
6	Bakau posts	16 ft. x 5 in. diameter	...	1.92
7	Broties	16 ft. x 3 in. x 2 in.	...	1.82
8	Poles	Light	...	0.64
60	Bricks		...	0.85
50	*Attaps*	6 ft.	...	0.50
1 gallon	Creosote		...	0.50
8	Hinges		...	0.40
	Nibong Slats		...	0.30
	Wire netting	6 ft. 6 in. x 3 ft. 6 in.; $\frac{1}{2}$ in. mesh		0.40
1 bundle	Rotan fibre		...	0.10
1 kati	Nails	Various	...	0.07
		Cost of Materials	...	15.50
		Transport of materials (say)	...	1.30
		Carpenter 4 days	...	3.20
		Total	...	20.00

Notes on Material.

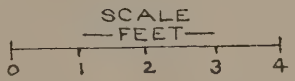
Item.	Required for:—	Remarks.
Planks	The walls of the kiln	New planks must be sun-dried before use.
Sheet iron	The tops of the wings	Old sheeting quite suitable.
Posts, Broties	The framework of the kiln	Jungle timber may be used
Poles	To support the roof	
Bricks	The hearth	Old bricks quite suitable.
Attaps	Main and wing roofs	Lay close and tie securely.
Creosote	All timber	Posts should be treated before planting.
Hinges	For main and firepit doors	
Nibong	The copra platform	
Netting	To cover the slats.	



(Section)



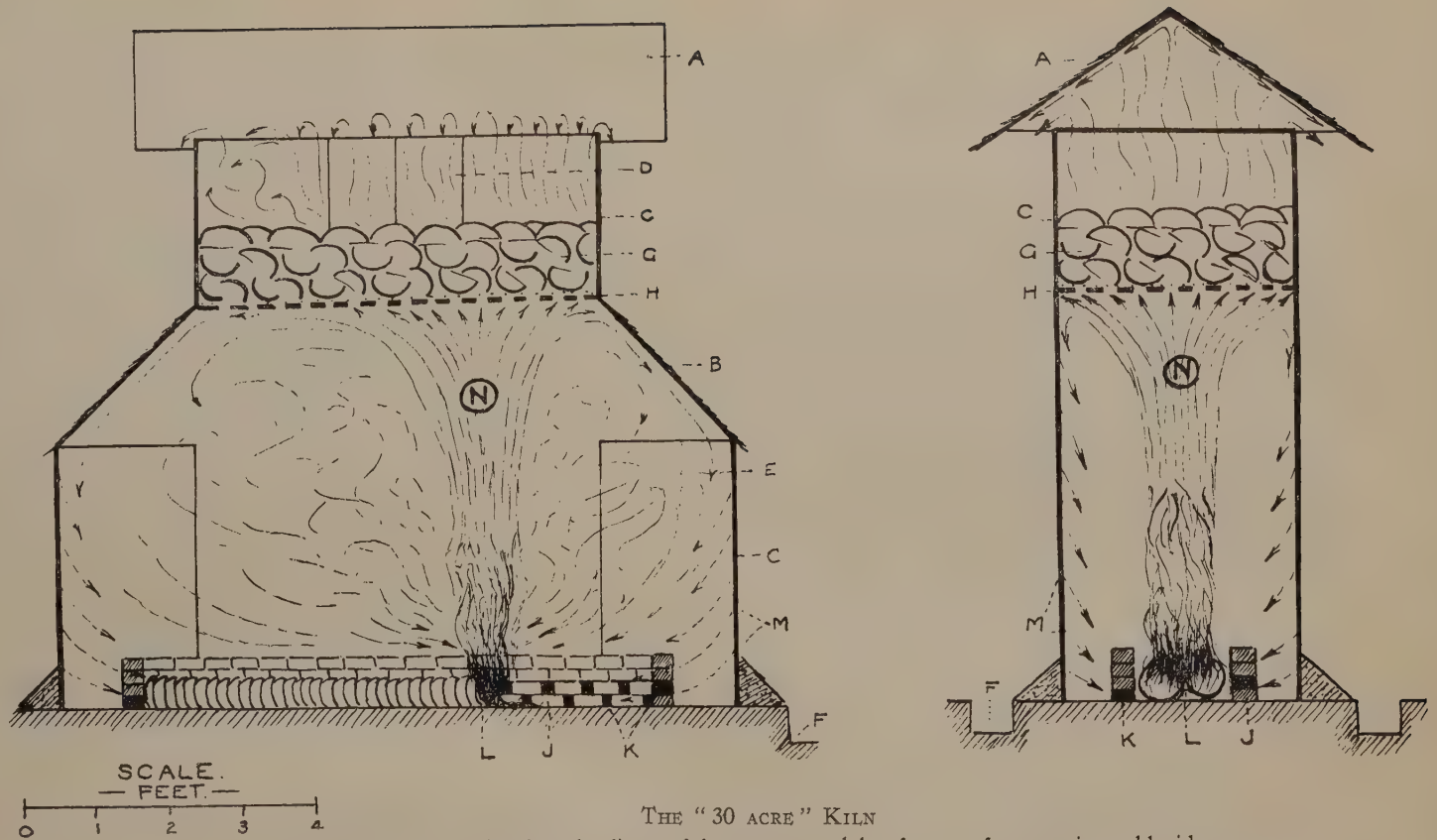
(Front View)



THE "10 ACRE" KILN

Diagram shewing imaginary lines of heat.

A. Attap Roofiet.
B. Attap or Sheet Iron Screens.
C. Plank Walls.
D. Charging Door.
E. Inspection Door.
F. Copra.
G. Copra Grill (3 ft. x 3 ft.).
H. Heat Spreader.
J. Wall of loose bricks.
K. Shell Fire.
L. Iron Tray.
M. Air Supply.
N. Bricks to divert heat vertically.
O. Rammed Clay.
P. Loose Bricks.



THE "30 ACRE" KILN

Sectional diagrams shewing the lines of heat as traced by fumes of ammonium chloride.

A. Attap Main Roof.
B. Attap-on-iron Wing Roof.
C. Plank Walls.
D. Double Doors for Copra.
E. Fire pit Doors.
F. Gutter round Kiln.
G. Copra.
H. Copra Grill.
J. Wall of loose bricks.
K. Gaps in brick work.
L. Travelling Shell Fire.
M. Cold Air Supply.
N. Travelling Cone of Heat.

Working Time Tables for Small Kilns.

"10 Acre" Kiln.		Fires Used.		"30 Acre" Kiln.	Fires Used.
7 a.m.	Light fire	40 pieces	8 a.m.	Light fire	150 pieces
10 a.m.	Fire out Light fire	40 pieces	11.30	Fire out	
1 p.m.	Fire out Light fire	40 pieces	12 noon	Light fire	70 pieces
4 p.m.	Fire out Light fire	40 pieces	4 p.m. 4.30	Light fire Turn copra and light fire	70 pieces
7 p.m.	Fire out Light fire and retire for night	40 pieces	8.30 9 p.m.	Fire out Light fire and retire for night	70 pieces
10 p.m.	Fire out		1 p.m.	Fire out	
6 a.m.	Remove copra and recharge kiln.		6 a.m.	Light fire	70 pieces
			10 a.m.	Fire out	
			10.30	Light fire	
				Extinguish fire when copra is dry	

Fires.

Double Row of Shells:—

Single Row of Shells:—

Comparative Performances of the Small Kilns.

Summary.	"10 acre" Kiln.	"30 acre" Kiln.
Number of nuts dried	100	300
Number of half shells used	200	500
Net firing time	15 hours.	23 hours.
Overall time	24 hours.	30 hours.

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MALAYAN AGRICULTURAL TRADE IN 1935

BY

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In a previous number of this Journal* an attempt was made to survey the agricultural trade of Malaya during the year 1934, and to contrast it with that of previous years. The method adopted is again employed in the present attempt to assess the extent and value of trade in 1935.

Consideration is given only to products which theoretically—although perhaps not economically—might be produced in Malaya. A consideration of the Malayan agricultural trade confined to such crops, and including livestock, meat and dairy produce, serves, therefore, the double purpose of providing an index figure of total local consumption and of shewing the scope which exists for local agricultural development.

Malayan agricultural trade will be considered under the following four headings:— the preparation for market and export of agricultural products grown within its borders (Export Crops); the import of agricultural products for local consumption (Import Products); the import of agricultural produce from surrounding countries, its re-conditioning, blending, grading as a preliminary to re-export (Entrepôt Trade); and lastly, the cultivation and marketing of Malayan crops for local consumption (Local Agricultural Produce).

Export Crops.

The principal export crops are rubber, coconuts, pineapples, oil palm, tapioca, sago and arecanuts. Gambier, once an important export crop, continues to decline, whereas tea and derris root (tuba) demand increasing attention.

Rubber.—In quantity and value, the production of rubber overshadows other local crops, which is not surprising when it is remembered that the area under rubber (3,282,000 acres) is almost twice as great as the total area under all other crops combined (1,706,000 acres). The control of production and exports exercised under the International Rubber Regulation Scheme was responsible for a decrease in output of rubber. The net exports were 416,000 tons, valued at $191,128,000, as compared with 466,000 tons, valued at $207,870,000 in 1934. It is estimated that of the total area of tappable rubber 20 per cent. was untapped throughout the year.

The average Singapore price of rubber in 1935 was 20.25 cents per lb., as compared with 20.63 cents in 1934, 10.21 cents in 1933 and 6.97 cents in 1932. The reduced production under the restriction scheme enabled the price to be maintained at the 1934 level, while total value of exports declined in value by $16,742,000.

Apart from rubber, the increase of production of crops for export was most marked. The total export of such products amounted to 314,500 tons, valued at $40,000,000, an increase over the previous year of 15.3 per cent. in quantity and of 71 per cent. in value. (See columns (4) and (5) in Table 3).

* *Malayan Agricultural Journal*, Vol. XXIII, No. 4, 1935.

The following figures of imports and exports embrace the principal agricultural products of Malaya.

Table I.
Imports and Exports of certain Agricultural Products 1935.

Product	Imports		Exports		Net Exports	
	Tons	Value $	Tons	Value $	Tons	Value $
Rubber ...	174,652	67,966,325	590,319	259,094,030	415,667	191,127,705
Coconut Products ...	106,061	7,409,458	261,314	22,016,324	155,253	14,606,866
Pineapples ...	—	162	73,923	8,330,902	73,923	8,330,740
Oil Palm Products	152	22,554	28,642	3,544,588	28,490	3,522,034
Arecanuts ...	41,900	3,761,031	64,785	6,702,314	22,885	2,941,283
Tapioca ...	5,845	507,161	24,256	2,157,032	18,411	1,649,871
Sago ...	61,775	2,333,139	69,616	3,432,700	7,841	1,099,561
Gambier ...	1,631	290,452	4,468	781,536	2,837	491,084
Derris ...	220	61,555	787	527,623	567	466,068

Coconut Products.—The production of coconut products reached a record high figure in 1935 as may be seen in the following table.

Table II.
Net Exports of Coconut Products.

Year	Fresh Coconuts		Copra		Coconut Oil		Total	
	Tons	Value $	Tons	Value $	Tons	Value $	Tons*	Value $
Av. 1923-1931	12,244	440,490	96,696	17,616,619	8,508	2,597,592	115,219	20,654,701
1932	7,824	316,166	97,277	10,755,596	11,949	1,985,726	118,886	13,057,488
1933	7,407	215,539	110,298	8,989,098	17,582	2,371,214	140,939	11,575,851
1934	7,201	190,192	95,599	5,864,692	25,484	2,322,358	139,028	8,377,242
1935	7,590	242,469	111,752	9,519,726	35,911	4,844,671	172,212	14,606,866

* In terms of copra equivalent.

Table III.

Annual Net Imports and Exports of Agricultural Products, Malaya

Year	Net Imports*		Net Exports† (excluding rubber)		Excess of Imports over Exports (excluding rubber)		Net Exports of Rubber		Excess of Total Imports over Exports	Excess Value of Exports over Value of Imports
	Quantity Tons	Value $	Quantity Tons	Value $	Quantity Tons	Value $	Quantity Tons	Value $	Quantity Tons	Value $
1	2	3	4	5	6	7	8	9	10	11
1923	643,000	101,600,000	206,600	43,100,000	436,400	58,500,000	181,700	227,200,000	254,700	168,700,000
1924	694,600	118,400,000	219,000	51,600,000	475,600	66,800,000	152,500	189,900,000	323,100	123,100,000
1925	744,800	133,100,000	218,700	48,600,000	526,100	84,500,000	161,800	519,000,000	364,300	434,500,000
1926	857,300	157,400,000	225,800	50,000,000	631,500	107,400,000	243,400	547,500,000	388,100	440,100,000
1927	956,000	167,400,000	207,500	42,700,000	748,500	124,700,000	190,700	351,400,000	557,800	226,700,000
1928	921,400	158,900,000	230,700	44,900,000	690,700	114,000,000	260,100	262,900,000	430,600	148,900,000
1929	1,004,500	171,700,000	254,700	44,000,000	749,800	127,700,000	418,000	353,700,000	331,800	226,000,000
1930	1,022,300	150,800,000	244,100	37,800,000	778,200	113,000,000	421,000	199,600,000	357,200	86,600,000
1931	883,200	92,100,000	241,200	26,700,000	642,000	65,400,000	393,600	99,300,000	248,400	33,900,000
1932	737,800	74,200,000	253,500	29,000,000	484,300	45,200,000	386,000	68,100,000	98,300	22,900,000
1933	770,000	66,700,000	265,700	25,600,000	504,300	41,100,000	405,300	101,400,000	99,000	60,300,000
1934	937,000	78,700,000	272,800	23,400,000	664,200	55,300,000	465,800	207,900,000	198,400	152,600,000
1935	885,100	81,100,000	314,500	40,000,000	570,600	41,100,000	415,700	191,100,000	154,900	150,000,000

* Imports include coir cordage and fibre, mats and matting, padi and rice, coffee, tea, kapok, mace and nutmegs, pepper, ginger, groundnuts and groundnut oil, sugar, tobacco, vegetables, livestock for food, meat, leather goods, milk, butter, poultry and eggs, feeding stuffs for animals, ataps, cloves, castor oil, gingelly seed, fruits, and tapioca refuse.

† Exports include rubber seed, coconut products, palm oil and kernels, canned pineapples, arecanuts, sago, tapioca, derris root, hides and skins, gambier, patchouli leaves and oil, mace and nutmegs.

The market price of coconut products improved somewhat from the very low level of the preceding year, sundried copra averaging $4.54 per picul, and coconut oil $9.13 per picul (133⅓ lbs.). The main feature of interest in relation to 1935, however, is the greatly increased production, as shewn by net exports—from 139,000 tons in 1934 to 172,000 tons in 1935, an increase due to the increase in area of palms in bearing and to a favourable cropping season. Attention is also directed to the steady rise in recent years of the production of coconut oil for export. Given favourable market conditions, it is probable that oil production will shew a further increase in 1936.

Pineapples.—With the tendency for the area under pineapples to decrease—due to the fact that new areas can no longer be developed as a catch crop with rubber—it was at one time thought probable that there would be a shortage of fruit for the canning factories. This has not yet become evident, for the net export of 73,923 tons in 1935 is an increase of 10.9 per cent. over the previous highest figure (in 1934). There seems no reason to suppose that this industry has reached its peak.

Oil Palm Products.—The production of palm oil and kernels now constitutes an agricultural export industry ranking fourth in importance. With new areas coming into bearing (only about 79 per cent. had reached the bearing stage in 1935) and other areas approaching the stage of maximum yield, the exports of these products from areas now planted must increase steadily for some years to come; until in fact, the production of oil is about 50,000 tons per annum. In 1935, therefore, Malaya had reached about half way towards maximum production from the present planted area.

Miscellaneous Products.—The remaining products shewn in Table I call for little comment in this place. Pepper is, however, omitted from the table. The net exports of pepper in 1935 were 3,563 tons valued at $6,482,271. These figures, however, do not mean that Malaya produces pepper in any quantity; the exports were from stocks held in Singapore, as the imports in 1934 greatly exceeded exports, while the enormous value was—in view of the collapse of the pepper market in London—largely a paper value.

The local production of tea is of growing importance. There is, of course, a net import of tea into Malaya, so that the Malayan production and export cannot be ascertained from the trade statistics. The total Malayan estate production of made tea in 1935 amounted to 631,662 lbs., of which 400,765 lbs. were exported, the remainder finding its way on to the local retail market.

Import Products.

There are a number of products (enumerated at the foot of Table III) which Malaya imports for local consumption. The net imports of such products in 1935 were 885,100 tons, valued at $81,100,000. Sub-division of this total shews that rice products accounted for 610,000 tons, valued at $32,855,000; livestock, meat, dairy produce and poultry 57,900 tons, valued at $3,862,000; sugar

101,000 tons, valued at $5,859,000; tobacco 5,373 tons, valued at $13,878,000; fruits and vegetables 72,000 tons, valued at $6,850,000; other products 38,827 tons, valued at $7,796,000.

The total shews a diminution in quantity, but a small increase in value.

Entrepôt Trade.

A large trade is centred on Singapore and Penang engaged in the treatment and preparation for world markets of the agricultural products of surrounding countries. The main items in this category are rubber, copra, sago and tapioca and certain of the spices. It is well-nigh impossible to assess the value of this trade, for it is also intimately connected with the entrepôt trade—which may consist merely in storage and reshipping. The nearest one can arrive at an estimate of its volume is to confine attention to the figures of gross imports. In this connexion reference is invited to columns 2 and 3 of Table I. There has been a reduction in the rubber re-milling industry in Singapore by reason of the propaganda and assistance rendered by the Government of the Netherlands Indies to small-holders, as a result of which a very large proportion of small-holders' rubber latex is now converted by them into a good quality of smoked sheet. It is understood that a contributory reason is the establishment of additional rubber re-milling factories in that country. As compared with 1934, when lower grade rubber imports were 131,863 tons, in 1935 they were 66,103 tons only.

In the year under review, the imports of tapioca were somewhat less than in the previous year, but on the other hand, the increase of imports of sago from 48,862 tons in 1934 to 61,775 tons in 1935 indicates the improved conditions of the Singapore sago refining industry.

Local Agricultural Produce.

The chief crops grown in Malaya for local consumption are rice, coconut products, vegetables, fruit, coffee and tea, besides a number of minor products. With the exception of rice, statistics are not available of the extent of production of these crops. The local production of rice in the season 1934-35 amounted to 315,078 tons, the value of which was about $19,000,000, as compared with 320,096 tons in the previous year, valued at about $16,000,000. The local production of rice fills 40 per cent. of Malayan consumption and is therefore a valuable contribution to the food requirements of the country. In addition, it is computed that the value of coconuts grown in Malaya for local consumption is about $4,000,000. Unfortunately, it is not yet possible to compute the value of the local production of fruits and vegetables; there is little doubt, however, that it exceeds the value of net imports of these products. If the value of all local produce were taken into account, it would probably be found that it was at least equal to the value of net imports of foodstuffs—in other words, Malaya has reached a position where it produces at least 50 per cent. of its food requirements.

Total Value of Agricultural Trade.

The volume and value of agricultural trade has been assessed for comparison with previous years. For this purpose, the quantity and value of the net imports of all products have been added and compared with the sum of all products of which there is a net export. . From these data a balance is struck of the volume and value to Malaya of the year's trading. In 1935, the net imports amounted to 885,100 tons, valued at $81,100,000 (including rice 610,000 tons, valued at $32,855,000). Net exports (excluding rubber) were 314,500 tons, valued at $40,000,000. Malayan agricultural trade, of crops other than rubber and rice, shews an excess of exports over imports of 39,400 tons, and the value of these net exports exceeded the value of the imports by $8,253,000. This is more favourable than in the previous year, when imports exceeded exports (excluding rubber and rice) by 77,000 tons, valued at $28,000,000 and indicates the turning point in the value of these industries.

To include all imports and exports of agricultural products will give a truer picture of the agricultural trade. This balance shews that Malayan imports of agricultural products exceeded her exports by 154,900 tons (as compared with 198,400 tons in 1934), but that the value of agricultural exports exceeded imports by $150,000,000.

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Miscellaneous.

THE AUSTRALIAN TRADE IN COCONUT FIBRE.

An enquiry was recently received for information concerning the Australian trade in coconut fibre (coir). The following notes are drawn from a communication by H.M. Senior Trade Commissioner in Australia and from a letter from one of the principal importers.

Imports.

In the year 1934-35, 24,189 cwts. of coconut fibre were imported into Australia, of which 22,301 cwts. were from Ceylon and 1,630 cwts. from India. The total value of these imports was £5,522. Queensland was the largest importer (14,107 cwts.), while other States imported as follows:—Victoria 4,593 cwts., New South Wales 2,494 cwts., South Australia 1,542 cwts., Western Australia 1,452 cwts. and Tasmania 1 cwt.

The demand is regular but, as will be seen from the above figures, not a large one.

Packing.

There are two types of packing suitable for the Australian market. The first type is in hydraulically-pressed bales containing 2 cwts., 2½ cwts., or 3 cwts. The measurement would be about 12 cubic feet for a 2 cwts. bale. The bale type of packing is not popular with many manufacturers as they find that the fibre is exceedingly hard to tease; they therefore prefer to pay a little extra for a looser packing. As a result, in many cases, fibre in ballots is more popular. A ballot is a small bundle of fibre varying in weight from 12 to 15 lbs., tied loosely with yarn made from coconut fibre. From 200 to 250 ballots weigh one ton.

Freight.

The freight rate on ballot fibre exported from Colombo to Australian ports is 30 rupees per ton of 6 cwts., equal to £7.2.6 sterling per ton of 2,240 lbs., while on bale fibre the freight is 40 rupees per ton of 50 cubic feet, equal to £5 sterling per long ton.

The freight on fibre is by far the largest item in the landed cost. Until recently, the f.o.b. price Colombo, of ballot fibre was exceedingly low and the price of £9.5.0 c.i.f. Sydney would represent an f.o.b. cost Colombo of £2.2.6. Bale fibre at that time was quoted at £7.12.6 per ton c.i.f. Sydney, representing £2.12.6 f.o.b. Colombo. At the end of January 1936, c.i.f. Sydney price for bale fibre was £10.0.0 and ballot fibre £11.2.6.

It is stated that the high freight charges on coconut fibre are made on the grounds that the fibre is hazardous cargo. They bear little or no relation to freight charges for other kinds of goods.

Reviews.

Vernalisation and Phasic Development of Plants.

Bulletin No. 15, Imperial Bureaux of Plant Genetics, Aberystwyth and Cambridge. December 1935, 151 pp., Price 10 shillings.

It has been popularly supposed that the growth of a plant proceeds side by side with its development, and that, as certain stages of growth are reached, certain stages of development follow more or less automatically.

During recent years, a new outlook on the problems of growth and development has arisen as a result of the theories formulated by the Odessa school of plant physiologists headed by T. D. Lysenko. According to Lysenko's theory "development consists of a series of stages, each of which requires for its completion a definite combination of external conditions. The conditions for one phase may be different from those required for others, temperature being the decisive factor for the first stage and light for the second. Each stage must be completed before the succeeding one can be initiated but once any stage has been completed there is nothing to prevent the progress of the following one, provided the necessary external conditions are forthcoming." By growth as opposed to development, Lysenko means the increase in size and weight of a plant as opposed to changes in its activity such as germination and reproduction.

By suitable treatment, the phases of development can be attained independently of growth. For example, winter wheat (which is normally sown in autumn and which is not successful if sown in spring) can be artificially stimulated to pass the phase of development which determines its reproduction (that is, its ability to produce a crop) by the treatment of the seed to certain conditions of temperature, light, humidity and aeration. The ability of the plant to bear a crop is thus pre-determined before sowing and winter wheat so treated can be sown in spring to give a satisfactory crop at the normal time in the autumn. This artificial conversion of a "winter" into a "spring" variety has given rise to the term "vernalisation".

From the practical point of view, this theory has proved of considerable importance, particularly in areas such as parts of Russia where winter crops cannot be grown owing to climatic conditions. Treated seed of winter wheat can now be sown in spring far to the north of areas where such varieties could be previously grown. The practice has recently been applied to crops other than wheat, and spinach, sugar beet and even potatoes have now been grown to maturity within the Arctic Circle.

A further effect of suitable treatment of seed is some hastening of maturity of the treated plants. The importance of this to the production of early market-garden produce is obvious.

How far the theory can be applied to plants growing under tropical conditions remains to be seen, though a certain amount of preliminary work has been

in progress in several tropical countries during the last two or three years. We know that many so-called "long day" plants seem unable to reach the phase which determines flowering under the short-day conditions experienced near the Equator. It is interesting to speculate on the possibilities of artificially inducing such plants to reach the critical phase determining flowering before growing them on to the fulfilment of this phase under normal local conditions.

The whole subject of vernalisation and phasic development is admirably summarized in the recent bulletin published jointly by the Imperial Bureaux of Plant Genetics of Aberystwyth and Cambridge. This bulletin summarizes in a comparatively brief space all the information on this most interesting subject available up to December 1935. A full bibliography and summaries of all the relevant literature are included, and the officers responsible for the compilation and editing of this work are to be congratulated on the lucid and straightforward way in which they have dealt with the extensive and complex work which has been done on this important new phase of plant-study.

B. A. L.

Imperial Bureau of Fruit Production.

Summary of Recent Work.

Imperial Bureau of Fruit Production, East Malling, Kent, England, Occasional Paper No. 4. Price 6d.

A three-page publication of the Imperial Bureau of Fruit Production, published in November, 1935, gives a summary of the recent work of the Bureau of tropical and sub-tropical interest. It is pointed out that while the Bureau Officers are chiefly concerned in the compilation of Horticultural Abstracts, a great number of which deal with tropical crops, numerous enquiries have been received from a number of countries requesting information or advice.

The Bureau is performing a very real service to those interested in fruit culture in the tropics, by personal touch, correspondence, by its publications and by the facilities provided for investigators to become acquainted with the progress of research work of a similar nature in other parts of the world.

ANNUAL PRIZE DISTRIBUTION AND SPORTS DAY, SCHOOL OF AGRICULTURE, MALAYA.

The annual prize distribution at the School of Agriculture at Serdang, took place on Thursday morning, April 9th. In addition to the staff and students there were present the Hon'ble The Director of Agriculture, S.S., and Adviser on Agriculture, Malay States (Dr. H. A. Tempany, C.B.E., M.F.C.) together with the following members of the School Advisory Committee—Lt. Colonel B. J. Eaton, O.B.E., and Messrs. Hawkins and Stanton.

The Principal, Mr. G. E. Mann, M.C., extended a welcome to Dr. Tempany and the members of the Committee. In reviewing the past year's work, Mr. Mann said, *inter alia*.

"It is customary for me on prize day to say something about the events of the past year. I believe that, during that period, the standard of training has been preserved at a satisfactory level and that the confidence shewn in the School both by Government and by the public has been well maintained. For a considerable part of the year, we have had no fewer than 76 students in residence, six more than last year and only four short of capacity; judging from the applications which have already been made for admission next May, there will be no falling off in numbers this coming year.

No fundamental changes have had to be introduced, either in the substance or in the manner of conducting the training and administration of the School. The sole addition to the curriculum is the inauguration of special evening classes in colloquial Tamil, mainly for the benefit of those students who contemplate taking up employment on estates. The innovation must be regarded at the moment as an experiment; but the reports which I have so far received indicate that the majority of the students concerned have made satisfactory progress in the language.

Of the 76 students on the past year's register, twenty-seven were private students, an increase of five over a year ago. Tuition fees, however, are at present levied in respect of all students other than some twenty-six who hold scholarships awarded by the Government of the Straits Settlements and Federated Malay States.

Of the students who have left the School in previous years, I have had favourable reports on the work of the majority—very favourable reports, in fact, in more than one case. To-day, another 47 students are leaving on the completion of their respective courses of training, and a number of these will be seeking employment in one capacity or another. Fourteen of them are returning to the Unfederated Malay States, on whose behalf they have been trained. Some four or five Malays can probably be absorbed in Government Service in the Straits Settlements and Federated Malay States, while three Chinese and three Malays will probably join the Rubber Research Institute as Asiatic Rubber Instructors. In due course, we hope to find employment for most of the remaining 10 students who have taken the Two Years Course. I have already received three offers of

employment on estates and am confident that more will follow, for the value of the School in this respect is slowly but surely making itself known.

Returning to the subject of actual training at the School, I referred a year ago to the facilities which we now have for including both practical and theoretical instruction in poultry husbandry. The School flocks have grown somewhat since then, and they continue to attract considerable interest not only from within but from outside sources. We have found it impossible to supply anything like the demand for good birds and for sittings of eggs. I would also refer to the fact that we have been able to carry out certain investigations during the past 12 months on the important problem of poor growth rate in young chicks.

As in past years, the students have shown a keen interest in all games and in their platoon of volunteers. This afternoon, we are for the first time holding annual athletic sports. They should go a long way towards encouraging the students' enthusiasm.

The usual special courses have been given at the School during vacations—a refersher course for junior officers of the Department of Agriculture, a special course for newly-appointed Asiatic Rubber Instructors, and a special course for Penghulus.

I again have pleasure in acknowledging the assistance which I have received from my staff, and in thanking a number of officers of the Co-operative Societies Department, Rubber Research Institute, and other branches of the Department of Agriculture for the valuable assistance which they have given. The staff of the Central Experiment Station, Serdang, deserve specially warm thanks in this respect.

Finally, Sir, I must express on behalf of the School our profound regret that you will shortly be leaving us, the respect and affection with which we shall remember you, and our sincere hope that your new appointment will one day afford you an opportunity of re-visiting us. Colonel Eaton also is soon leaving Malaya, and our best wishes for a happy retirement will certainly accompany him".

Mr. Mann then called upon Dr. Tempany to distribute the prizes, diplomas and certificates which had been awarded in respect of the various courses of training, at the conclusion of which Dr. Tempany congratulated the successful students and in the course of his address said:—

"For me this occasion to-day has something of sadness about it, for it is probably the last opportunity that I shall have of addressing those associated with the School of Agriculture, Malaya, as I am leaving this country permanently in little more than a month's time.

But it is a source of considerable satisfaction to me to know that, after five years of existence, this School is firmly established and that it is fulfilling in large measure the aims and objects with which it was inaugurated. I count it a very great honour that it has fallen to my lot to see this institution started during my tenure of office as head of the Agricultural Department in this country and to

have borne some part in bringing about the very satisfactory situation with which we are confronted to-day.

At such a time as this it is permissible to look back on the past; during these five years there have been many anxious moments, the country has passed through a period of black depression, the like of which, I trust, we shall never see again; and during that time the fate of this School hung for a while trembling in the balance, before it had had time to demonstrate its utility. Fortunately the threatened blow was averted, and the School was given the opportunity which it deserved of proving its utility; of this opportunity, I think, full advantage has been taken.

This School is now full almost to capacity; next year the demands for admission bid fair to exceed the available accommodation. This in itself, I think, is the strongest tribute which the public of Malaya could pay to the School.

Another event of considerable interest is the coming into being of what may be termed the first child of the School in the shape of the Farm School at Malacca which started work last September. A second Farm School will, it is hoped, be opened in Penang next year and possibly a third in Singapore.

The course of instruction at these Farm Schools is of a somewhat lower standard than that of our one year course, but like it, however, the instruction is essentially practical and is intended particularly to benefit the sons of small-holders.

If these ventures succeed, as I hope they will, there seems to be no reason why there should not ultimately arise a chain of Farm Schools extending throughout the Peninsula, with this institution at the head of the chain.

For the success which this School has achieved no small amount of credit is due to Mr. Mann, the Principal, and his staff; it is with pleasure that I express my appreciation of the hard work which they have performed during these years.

I shall leave this country with very deep regret. Its charm and the wide diversity of its agricultural interests give to it a fascination that is all its own; I believe that its future can be very bright; I believe that there is no tropical country that possesses greater potentialities. It is favoured in that it possesses an Asiatic agricultural population that is inately intelligent; to-day it occupies a leading place among British tropical possessions; but if it is to maintain that position in the face of the severe competition which is everywhere the rule, it is necessary to maintain a progressive outlook. The country cannot stand still, it must either go forward or go back.

For progress full advantage must be taken of any opportunity that offers and people must be receptive of new ideas. In achieving progress the system of agricultural education, of which this School forms a part, can play a rôle of the highest importance. Of that I am firmly convinced.

I shall watch the future progress of this School with unfailing interest and if in the future it should rise to heights of which we do not dream at present, I shall feel an abiding sense of satisfaction.

I would like to wish every student present all possible success and would also like to express my very deep appreciation of the very happy and cordial

relations which have prevailed between myself and the staff as well as students and pupils of the School throughout my tenure of office.

Finally I would like to thank the Advisory Committee for their never failing help and support which has been freely forthcoming at all times".

Colonel Eaton said *inter alia*:—

"Since this is the last occasion on which I shall have the pleasure of attending your Annual Prize Giving, I should like to express my thanks to your Principal for the opportunity of making a few remarks.

As most of you are aware, in the Rubber Research Institute there are at present fourteen former students of this School and I hope this year we may get six or eight more to complete our cadre in the Small-Holders' Advisory Service of Rubber Instructors.

You will therefore realize that I have had some opportunity of assessing the value of the instruction which you have received at the School, and how it has been applied in practice, since every month I read a report compiled by each of the 14 Instructors.

With few exceptions, I can tell you that these reports are excellent and indicate that our Instructors have benefited by the training they have received here as students and several of them have shown initiative in applying their training.

There are two thoughts only which I should like to impress on you all—they are the value of observation and the cultivation of a critical faculty. In scientific work particularly—as also in other branches of learning—no real advances in knowledge are made unless we are keen observers, have a critical faculty and can draw deductions from our observations. Your observations can often be of the greatest value also to those who may have a little more experience and knowledge than yourself.

Your are aware of the economical and useful rubber smoke house which we are now recommending for use on small holdings. It has developed entirely from an observation made by a former student of this School who is one of our Rubber Instructors, and credit is due to him for observing this type of smoke house on a small holding and sending us drawings and a description on which we were able to make further improvements. Since that, several other Instructors have sent us useful suggestions for alternative construction.

In closing, I wish you all the greatest success and would predict that even though some of those present may in the future undertake work other than of an agricultural nature you will still find your training here, owing to a combination of its breadth and fundamental nature, to be of the greatest value".

FROM THE DISTRICTS.

Compiled by the Chief Field Officer from Monthly Reports submitted by Agricultural Officers.

March, 1936.

The Weather.

On the east coast of Pahang and Johore the weather was cool and wet with a precipitation nearly double the average.

Elsewhere the shorter dry season terminated in most parts of the Peninsula during or at the end of the second week of March, but around Taiping and in parts of Lower Perak and Ulu Selangor Districts it continued until the end of the third week of March. For the remainder of the month showers and thunderstorms, of varying frequency and intensity, were experienced giving a rainfall which varied considerably in different regions. It was above average in Kedah and Province Wellesley, around Tanjong Malim, in central Johore and along the west coast from the mouth of the Perak River southward. It was about average in Krian and Kelantan and below average over the remainder of the country.

Remarks on Crops.

Padi.—Harvest was completed in the Tanjong Karang *mukim* of Kuala Selangor District, in Negri Sembilan and in Malacca; it was nearly completed in Kedah, Penang and Province Wellesley except the Sungei Acheh area, Krian and other parts of Perak except Larut and Bruas Districts, and in the road mukims of Lipis and Raub Districts in Pahang.

Reaping was in full progress in Larut and Bruas Districts of Perak, in the Panchang Bedena *mukim* of Selangor, in Kelantan and the coastal mukims of eastern Pahang.

Reports indicate that the crop in Kedah is satisfactory, but that yields in the Settlements of Penang will be below those of the previous season, although they were good in the Northern District of Province Wellesley. In Krian the planted area is roughly estimated as 48,980 acres or about the same as in the previous season, but the crop of some 16,750,000 gantangs shows a decrease. The crop was quite fair in Central Perak except Bruas District, but in the Sungei Manik area in Lower Perak yields were disappointing, being below those anticipated earlier in the season. Yields from measured plots gave 350 gantangs per acre in the older part of this area and 290 gantangs per acre in the recently developed portion.

In Selangor the Tanjong Karang crop was satisfactory and from the Panchang Bedena and Sungei Panjang mukims a good surplus of padi is expected. In

Panchang Bedena *mukim* crop-cutting tests on plots of Siam 29 grown from Government seed gave yields ranging from 500 to 680 gantangs per acre.

Returns so far received indicate that the Negri Sembilan crop will be slightly below that of the previous season. In Malacca a poor crop in Alor Gajah District was offset by good yields elsewhere, so that the total for the Settlement should be about the same as in 1935. In Kelantan also in spite of wet weather during harvest the crop is expected to be satisfactory and about the same as that of last year.

In Krian the Government mills purchased at a premium of 1 cent some 410,000 gantangs of unmixed padi of the strain Seraup 48.

Supplies of padi for the Government Mill at Temerloh continued to come forward and the mill began working again on the 2nd March.

In the Temerloh District of Pahang nurseries were sown and preparation of the land was commenced. There was a notable increase in the use of implements for this work as a result of the demonstrations previously given. The construction of bunds and other work on the new Kerdau Test Plot in this District were closely watched by neighbouring cultivators and copied by some of them.

Dry nurseries for seedlings are in almost universal use in Pahang and are often planted on State Land. This practice is wasteful of land and involves a risk of losing the young plants through drought. Demonstrations of the advantages of wet nurseries were given in Lipis District.

Rubber.—Wintering came to an end during the month and at its close there was a good growth of new foliage on the trees. The production of both new leaf and flower after wintering was in many localities heavier than has been seen during the past few years, as the showery weather during the second half of the month was favourable to the new growth.

Leaf mildew (*Oidium Heveae*) was present on estates and small holdings in parts of Penang and Province Wellesley and the Sitiawan and Batang Padang Districts of Perak. It was generally distributed throughout Selangor, Negri Sembilan, Malacca and Johore, but was not reported from Kedah, Pahang or Kelantan. Except on one or two estates the attack was considerably milder and did less damage than that experienced in 1935, as weather conditions were less favourable to the growth of the fungus.

There was a further reduction in the number of holdings in tapping in all localities, except northern Pahang. This was mainly due to the exhaustion of export coupons at the end of the quarter, which resulted in maintaining a high price for coupons and a low price for rubber without coupons. Contributory factors were pre-occupation with padi harvest, the effect of wintering on yield and, in some localities, unfavourable weather conditions. It is reported from Negri Sembilan that cessation of tapping on so many small holdings is causing hardship to those members of the rural population who, owning no land, are dependent for a living on obtaining employment as hired tappers on neighbouring small holdings.

The difference between the price of smoked and that of unsmoked sheet continued to be small, but in spite of the discouraging effect of this narrow margin on the production of smoked sheet, additional small-holders' smoke cabinets were erected in several localities.

In Pahang arrangements have been completed whereby each rubber dealer displays samples of different grades of rubber with the local price for the day of each grade. The producer can thus see at once to which grade his rubber belongs, what price is offered for it, and what additional price he might have obtained had it been of better quality. This scheme has already resulted in the production of a higher percentage of the better grades in Temerloh District.

Copra.—A special course in copra making and the construction of miniature kilns was given to seven Malay Officers from Johore at the Klang Coconut Experiment Station during the period March 9th to 11th.

Elsewhere in this number is an article by the Officer-in-Charge of Copra Investigations describing types of kilns recently designed for small-holders. In Bagan Datoh District one 30-acre kiln was erected by Government for demonstration purposes, but did not meet the requirements of small-holders in that area because its capacity was so small that its owner would have to devote so many days each month to copra making that he would have insufficient time left to devote to other forms of work from which to supplement his income. Consequently a twin kiln of twice the capacity was erected and tested in this District during March. This attracted considerably greater interest.

In the coconut areas of the west coast of Johore five 30-acre kilns have recently been completed for demonstration purposes and have in trial working produced copra of satisfactory quality. Two of these kilns in Muar District cost $11.39 and $11.34 respectively, exclusive of labour. These small kilns have attracted considerable attention in Johore.

A demonstration kiln of each of these two types has been erected in Kuala Selangor and a 30-acre kiln has been built at the Farm School on the Sungei Udang Agricultural Station in Malacca.

The slight fall in the price of copra during the month did not result in loss of interest in copra-making in most areas, though it is stated that small-holders in Klang District ceased making copra.

In Province Wellesley the price of nuts still remained high in spite of increased yields and copra making was not profitable.

In the Southern District of the Province coconuts suffered from combined attacks of the caterpillars of *Hidari irava,* (the skipper butterfly), *Chalcoscelis albiguttata* (the gelatine grub), and *Parasa lepida* (a stinging caterpillar). The attacks of the first and last mentioned caterpillars appear to have terminated, though they have been responsible for most of the damage.

Agricultural Stations and Padi Test Plots.

At the Gajah Mati Agricultural Station in Kedah pepper vines growing on living supports of *Gliricidia maculata* and Dadap (*Erythrina* spp.) have not done

well. Hard-wood poles are now being substituted. Good progress was made with the development of the new Ayer Itam Agricultural Station in Penang, which has already begun to attract visitors.

At the Kuala Kangsar Agricultural Station hot dry weather during the month caused the death of a number of young rambutan and durian buddings, which had taken successfully in February, in spite of careful attention to extra shading and watering. Preparation for planting the area recently added to this Station proceeded satisfactorily.

In Johore the clearing of the new Agricultural Station at Tangkah was nearly completed. A cover crop was sown and sub-division into half-acre blocks was commenced. Progress was also made in preparing the site of the new Central Experiment Station of 30 acres at Ayer Hitam.

Harvest has been completed on most of the Padi Stations and Test Plots and the results of experiments are now being examined and analysed by officers of the Research Branch.

On the Dong Padi Test Plot in Pahang yields were much below those of the previous season. The best yielding pure strains were Milek Kuning 3 with 456 gantangs, Siam 29 with 440 gantangs, Radin 2 with 420 gantangs and Nachin 11 with 417 gantangs per acre. The highest yielding local variety was Serendah Puteh with 390 gantangs per acre.

On the Tanjong Karang Test Plot in Selangor, Reyong 20 in one Latin Square yielded at the rate of 620 gantangs per acre, while Radin 2 and Radin China 12 also did well with over 550 gantangs per acre.

In Pahang a new Test Plot has been opened at Kerdau in place of that formerly used at Temerloh. Nurseries were sown on this plot and preparation of the land with implements was commenced. Sowing of nurseries and preparation of the land were also in progress on the Bawang and Pekan Test Plots in Pekan District.

All-Malayan Padi Competition.

Mukim padi competitions were held in nine centres in the Serendah District of Negri Sembilan. Total exhibits again showed a decrease. Local cultivators now realize that a high standard of exhibit is required and that the local practice of cultivating two or more types of padi on small areas combined with lack of care in selecting the seed renders the production of unmixed samples of grain for exhibition purposes a matter of considerable difficulty.

In contrast to this was the increase in number and improvement in quality of the exhibits brought to the three local competitions in the down river mukims of Kuala Lipis District in Pahang. Moreover the cultivators themselves took a great interest in these Shows and asked a large number of questions after judging had been completed. The State Agricultural Officer received valuable assistance from the District Officer, Lipis, at all three centres both in judging the padi and in explaining the purpose of the Shows and other matters to the exhibitors.

DEPARTMENTAL NOTES.

Appointment of Dr. H. A. Tempany as Assistant Agricultural Adviser to the Secretary of State for the Colonies.

The Hon'ble Dr. H. A. Tempany, C.B.E., D.SC., F.I.C., F.C.S., Director of Agriculture, Straits Settlements, and Adviser on Agriculture, Malay States, has been appointed Assistant Agricultural Adviser to the Secretary of State for the Colonies, and will assume the duties of his new appointment about the 24th July 1936.

In consequence of this appointment Dr. Tempany retires from his present post which he has held since 6th January, 1929, and expects to leave Malaya on 23rd May, 1936.

Exhibition to Tourists at Malacca.

As has been the custom in past years, an exhibition of local agricultural products was staged in Malacca on the occasion of the visit of the s.s. "Reliance" on 10th March 1936. This exhibition was prepared at the request of the Agents, Messrs. Sime, Darby & Co. Ltd., with whose assistance and that of the Rubber Research Institute of Malaya a thoroughly comprehensive exhibit was staged which appeared to be much appreciated by the visitors.

Tour of the Rural Lecture Caravan.

The Rural Lecture Caravan toured Upper Perak, Parit, Bruas and Sitiawan Districts during the month. Successful shows were held in all centres visited. Special interest was shown in the small-holders' rubber smoking cabinet and the kampong poultry house.

ANTI-MALARIA PRECAUTIONS.

Published at the request of the Malaria Advisory Board, F.M.S.

The Malaria Advisory Board invites the attention of planters to the danger to health, likely to arise during the replanting of rubber, from the breeding of anopheline mosquitoes in pits left by the uprooting of trees and in holes prepared for replanting. Care should be taken to avoid the accumulation of water in such places, within half-a-mile of houses, as they may rapidly become the source of large numbers of *Anopheles maculatus* and other malaria-carrying mosquitoes.

Pits left by the uprooting of old trees should be filled up immediately. It is suggested that holes prepared for replanting, which are likely to become a source of mosquito breeding, should be kept *filled* with cut vegetation. Planting should, however, be undertaken as early as possible.

Statistical.

MARKET PRICES.

March, 1936.

Major Crops.

Rubber.—The market continued and maintained its improved condition, and, after the early part of the month, the price in Singapore did not fall below 26 cents per lb. Spot loose opened at 25½ cents per lb. and closed at 26⅛ cents per lb. The average price for March of No. 1 X. Rubber Smoked Sheet was 26.04 cents per lb. as compared with 25.38 cents in the previous month. The average price in London was 7.44 pence per lb., and in New York 15.86 cents gold, as compared with 7.27 pence and 15.38 cents gold in February.

Prices paid for small-holders' rubber at three centres during the month are shewn in the following table.

Table I.

Weekly Prices Paid By Local Dealers for Small-Holders' Rubber, March, 1936.

(Dollars per Picul.)

Grades.	Kuala Pilah, Negri Sembilan.		Kuala Kangsar, Perak.			Batu Pahat, Johore.		
	5	12	4	11	25	4	11	18
Smoked sheet	32.60	33.35	32.87	33.10	33.40	32.50	33.00	
Unsmoked sheet		32.00				30.60	31.30	31.80
Scrap		28.00						

Transport by F. M. S. R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8.00 per ton.

Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway $6.20 per ton.

Transport from Kuala Kangsar to Singapore by railway $10.00 per ton (minimum consignment 5 tons).

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent

No purchases at Batu Pahat on the 25th, at Kuala Kangsar on the 18th, and at Kuala Pilah on the 19th and 26th March.

Palm Oil.—Prices weakened very considerably during March as shewn in the following table.

Table II.

Prices of Palm Oil and Palm Kernels.

Date 1936.	Palm Oil in Bulk, c i.f. landed weight Liverpool/ Halifax.	Palm Kernels, c.i.f. landed weight London/ Continent
	per ton	per ton
Feb. 28	19. 0. 0	10. 12. 6
Mar. 6	18. 0. 0	10. 0. 0
„ 13	18. 0. 0	10. 0. 0
„ 20	18. 0. 0	10. 0. 0
„ 27	18. 2. 6	10. 0. 0

Copra.—Prices weakened still further during the first half of March, but recovered and remained stable in the second half. The sun-dried grade opened in Singapore at $5.05 per picul, fell to $4.75, and closed at $5.20, the average for the month being $5.09 per picul as compared with $5.68 in February. The mixed quality was consistently 50 cents lower, averaging $4.59 as compared with $5.16 in the previous month.

Copra cake improved to $1.40 per picul in the second half of the month, the average being $1.32 as against $1.34 in February.

Rice.—The average wholesale prices of rice per picul in Singapore for February were as follows:—Siam No. 2 (ordinary) $3.81, Rangoon No. 1 $3.35, Saigon $3.35, as compared with the previous month's corresponding prices of $3.64, $3.45 and $3.37. February 1935 prices were $3.37, $3.25 and $3.32.

The average retail market prices in cents per gantang of No. 2 Siam rice in February were:—Singapore 32, Penang 28, Malacca 26, as compared with 34, 30 and 26 respectively in January.

The average declared trade value of imports of rice in February was $3.46 per picul, as compared with $3.64 in January and $3.63 in December 1935.

Padi.—The Government Rice Mill at Bagan Serai raised its price for padi from $1.70 to $1.80 per picul at the beginning of the month, and at Parit Buntar to $1.85. The price was subsequently raised to $2, and later, towards the end of the month, to $2.20 per picul. Retail prices per gantang ranged from 5 to 13 cents in different parts of the country.

Pineapples.—Prices in Singapore were reduced during March by the Packers' Combine, and closing prices per case were:—Cubes $3.20, Sliced Flat $3.10, Sliced

Tall $3.20. Average prices for the month were $3.27, $3.16 and $3.25 respectively as compared with $3.45, $3.25 and $3.35 in February.

Prices of fresh fruit per 100 were:—Selangor $1 to $3; Singapore $2.90 to $3.10; Johore, 1st quality $2 to $5, 2nd quality $1.50 to $3.50, 3rd quality 80 cents to $2.

Beverages.

Tea.—Ten consignments of Malayan tea were sold on the London market during March. One consignment of highland tea averaged 1s. 0¾d. per lb., and the remaining consignments—of lowland tea—were sold at prices ranging from 11¾d. to 1s. 0½d. per lb., the average being 1s. 0⅛d. per lb.

Average London prices per lb. during March for tea consignments from other countries were as follows:—Ceylon 1s. 3.11d., Java 11.09d., Indian Northern 1s. 1.06d., Indian Southern 1s. 1.52d., Sumatra 10.59d.

The latest Colombo average prices available are quoted from the *Weekly Tea Market Report,* 31st March, 1936, of the Colombo Brokers' Association, and are as follows (rupee cents per lb.):—High Grown Teas 74 cents, Medium Grown Teas 62 cents, Low Grown Teas 59 cents.

Coffee.—Prices for Sourabaya coffee were lower than in the previous month, but improved slightly at the close, opening at $12 to $13 per picul and rising to $13.50 to $14.50. Palembang coffee weakened slightly also, the average price for the month ranging from $7.31 to $8.37 per picul, as compared with $7.38 to $8.38 in February.

Prices of locally-grown coffee continued low, ranging from $12 to $28 per picul.

Spices.

Arecanuts.—Prices in Singapore fell still further during March with the exception of Sliced which shewed an improvement over the previous month. Average prices per picul were:—Splits $4 to $5.56; Red Whole $3.87 to $4.81; Sliced $8.12 to $9.31.

The Singapore Chamber of Commerce average prices per picul were:—Best $6.17, Medium $5.60, Mixed $4.35, as compared with $6.41, $5.89 and $4.82 respectively in February.

Pepper.—Prices in Singapore continue to be virtually nominal with practically no business passing. Prices per picul in March remained unchanged and were:—Singapore Black $8.50, Singapore White $16, Muntok White $16.50. February average prices per picul were $8.90, $16.30 and $16.80 respectively.

Nutmegs.—Prices fell still further in Singapore in the first half of the month, but improved slightly at the close; 110's averaged $28.25 per picul, and 80's $29 per picul, as compared with $32 and $32.80 respectively in February.

Mace.—Siouw weakened slightly, averaging $92.50 per picul as against $102 in February, and Amboina improved to average $73.75 as compared with $73 per picul.

Cloves.—Nominal quotations were marked up slightly at the close of March to $38 per picul for both Zanzibar and Amboina.

Cardamoms.—According to the Ceylon Chamber of Commerce weekly reports green cardamoms were quoted during March at Rs. 1.15 to Rs. 1.27 per lb. rising to Rs. 1.25 to Rs. 1.31.

Miscellaneous.

Tuba Root (*Derris*).—The Singapore market continued to improve during March. The average price for roots sold on rotenone content was $52 per picul, and for roots sold on a basis of ether extract was $34.50. These prices shewed an improvement of $3 per picul over the February averages.

Gambier.—Singapore prices continued unchanged at the February levels; they were:—Block $6.50, and No. 1 Cube $10.50 per picul.

Tapioca.—Tapioca prices also remained unchanged and were:—Flake Fair $5.50, Seed Pearl $5.50, Medium Pearl $6.50 per picul.

Sago.—Pearl, Small Fair, improved slightly to average $3.75 per picul, while Flour, Sarawak Fair, was quoted throughout the month at $2.35 per picul as compared with the average price of $2.48 per picul in February.

Tobacco.—Prices of locally grown tobacco varied considerably in different parts of the country. In Selangor first quality ranged from $60 to $90 per picul and in Kelantan also first quality was quoted at $90, 2nd and 3rd qualities being $70 and $45 respectively. Elsewhere prices were: 1st quality $25 to $60, 2nd quality $16 to $35, 3rd quality $10 to $20.

The above prices are based on London and Singapore daily quotations for rubber; on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports are kindly supplied by Messrs. Guthrie & Co. Ltd., Kuala Lumpur; the Singapore prices for coffee and arecanuts by the Lianqui Trading Company of Singapore, and tuba prices by Messrs. Mackay & Co., Singapore.

1 picul = 133⅓ lbs. The Dollar is fixed at two shillings and four pence.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57, Charing Cross. London, S.W.1.

GENERAL RICE SUMMARY*

February, 1936.

Malaya.—Imports of foreign rice during February were 64,203 tons, and exports 14,493 tons. Net imports for January and February were 83,936 tons, an increase of 17.4 per cent. as compared with 1935†.

Of the imports during February, 54 per cent. were consigned to Singapore, 16 per cent. to Penang, 7 per cent. to Malacca, 20 per cent. to the Federated Malay States and 3 per cent. to the Unfederated Malay States. Of the total, 68 per cent. were from Siam, 26 per cent. from Burma, 5 per cent. from French Indo-China, and 1 per cent. from other countries.

Of the February exports, 73 per cent. were consigned to the Netherlands Indies and 27 per cent. to other countries. The various kinds of rice exported were:—(in tons, percentages in brackets) Siam 11,225 (77.4), Burma 2,490 (17.2), French Indo-China 690 (4.8), parboiled 26 (0.2), local production 62 (0.4).

India and Burma.—Foreign exports during January were 77,000 tons, a decrease of 18.1 per cent. when compared with 94,000 tons in the previous year. Of these exports 2.6 per cent. were to the United Kingdom, 1.3 per cent. to the Continent of Europe, 58.4 per cent. to Ceylon, 26.0 per cent. to the Straits Settlements and the Far East, and 11.7 per cent. to other countries. The corresponding 1935 percentages were:—2.1, 1.1, 44.7, 36.2 and 15.9.

Burma's total exports of rice and bran (*Bangkok Times,* 2nd March, 1936) during January were 274,655 metric tons, as compared with 315,135 metric tons in 1935, a decrease of 12.8 per cent.

According to the final rice forecast for All-India for the 1935-36 season (*Indian Trade Journal,* 5th March, 1936) the total yield is estimated at 27,719,000 tons as compared with 30,261,000 tons in the 1934-35 season. The exportable surplus of the Burma crop is estimated to be 3,500,000 tons of rice and rice products.

Siam.—Exports of rice and rice products from Bangkok during January are provisionally given as 141,060 tons as compared with 164,362 tons in 1935.

The estimated exportable surplus of rice and rice products, including the balance from 1935, is 1,672,681 tons.

Japan.—The latest information available was published in the Rice Summary for January.

French Indo-China.—Entries of padi into Cholon during January and February totalled 318,851 metric tons as compared with 350,015 metric tons in 1935, a decrease of 8.9 per cent. Exports of rice were 222,803 metric tons, a decrease of 27.5 per cent. as against 307,471 metric tons.

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* Abridged from the Rice Summary for February, 1936, compiled by the Department of Statistics, Straits Settlements and Federated Malay States.

† It is to be understood throughout the summary that all comparisons and percentage increases or decreases are in relation to the corresponding period of 1935.

Netherlands Indies.—According to *The Netherlands Indies Economic Bulletin,* 1st March, 1936, the area under padi harvested during 1935 was 9,346,480 acres as compared with 8,336,250 acres in 1934.

Imports of rice during 1935 totalled 387,120 metric tons as compared with 278,836 metric tons in the previous year, an increase of 38.8 per cent.

Ceylon.—Imports for the first two months of the year aggregated 100,543 tons, an increase of 18.4 per cent. as compared with 84,912 tons in the previous year.

Of these imports, 8.8 per cent. were from British India, 64.3 per cent. from Burma, nil from the Straits Settlements and 26.9 per cent. from other countries. The corresponding 1935 percentages were 13.5, 71.2, 1.6 and 13.7.

Europe and America.—Shipments to Europe from the East during the period 1st January to 13th February amounted to 28,614 tons, as compared with 17,671 tons in 1935, an increase of 61.9 per cent. Of these, 50.1 per cent. were from Burma, 39.5 per cent. from Siagon, 6.4 per cent. from Siam, and 4 per cent. from Bengal. The relative percentages for 1935 were 30.7, 40.8, 20.3, and 8.2.

Shipments for the Levant for the same period were 2,296 tons, a decrease of 60.4 per cent., and to Cuba, West Indies and America from the 1st January to 15th February were 11,009 tons, an increase of 26.5 per cent.

MALAYAN AGRICULTURAL EXPORTS, JANUARY AND FEBRUARY, 1936.

PRODUCT.	Net Exports in Tons					
	Year 1935	Jan.-Feb. 1935	Jan.-Feb. 1936	February 1935	January 1936	February 1936
Arecanuts ...	21,885	3,624	5,819	856	3,165	2,654
Coconuts, fresh †	106,272†	14,745†	17,512†	7,593†	9,629†	7,883†
Coconut oil ...	35,911	4,565	6,619	2,061	3,130	3,489
Copra ...	111,752	23,090	8,933	11,904	7,292	1,641
Gambier, all kinds	2,837	422	415	182	200	215
Oil cakes ...	11,361	1,775	1,557	852	1,054	503
Palm kernels ...	3,892	560	582	215	402	180
Palm oil ...	24,996	3,176	3,338	1,911	1,610	1,728
Pineapples canned	73,923	9,624	11,532	5,156	6,788	4,744
Rubber ¶ ...	378,381¶	67,130¶	60,599¶	30,109¶	33,329¶	27,270¶
Sago,—flour ...	10,920	2,706	1,301*	799	339	1,640*
,, —pearl ...	4,655	789	459	286	277	182
,, —raw ...	7,735*	1,140*	1,335*	444*	960*	375*
Tapioca,—flake ...	1,953	396	322	159	165	157
,, —flour ...	755*	115*	274*	148	7	281*
,, —pearl ...	17,169	2,011	1,944	1,052	990	954
Tuba root ...	567	136½	117	95½	67	50

† hundreds in number. * net imports. ¶ production.

MALAYAN PRODUCTION (IN TONS) OF PALM OIL AND KERNELS

(As declared by Estates)

Month 1936	Palm Oil		Palm Kernels	
	F.M.S.	U.M.S.	F.M.S.	U.M.S.
January ...	1,395.4	326.5	258.6	37.2
February ...	1,531.9	372.4	244.2	54.6
Total ...	2,927.3	698.9	502.8	91.8
Total Jan. and Feb. 1935 ...	2,039.7	560.2	335.7	88.1
Total for year 1935 ...	17,338.7	5,764.6	2,711.1	818.4

MALAYAN RUBBER STATISTICS

ACREAGES OF TAPPABLE RUBBER NOT TAPPED ON ESTATES OF 100 ACRES AND OVER, FOR THE MONTH ENDING 29TH FEBRUARY, 1936.

STATE OR TERRITORY	Acreage of Tappable Rubber end 1934	ESTATES WHICH HAVE ENTIRELY CEASED TAPPING		ESTATES WHICH HAVE PARTLY CEASED TAPPING (*a*)		AREA OF TAPPABLE RUBBER NEVER BEEN TAPPED		Total (3) + (5)	Percentage of (9) to (2)
		Acreage	Percentage of (3) to (2)	Acreage	Percentage of (5) to (2)	Acreage	Percentage of (7) to (2)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
STRAITS SETTLEMENTS :—									
Province Wellesley	44,691	965	2.1	15,724	35.2	688	1.5	16,689	37.3
Malacca	123,793	1,955	1.6	32,820	26.5	3,425	2.8	34,775	28.1
Penang Island	2,593	Nil	Nil	610	23.5	254	9.8	610	23.5
Singapore Island	33,312	3,222	9.7	9,342	28.0	417	1.3	12,564	37.7
Total S.S. ...	204,389	6,142	3.0	58,496	28.6	4,784	2.3	64,638	31.6
FEDERATED MALAY STATES :—									
Perak	295,895	10,580	3.6	70,854	23.9	14,978	5.1	81,434	27.5
Selangor	345,100	11,488	3.3	73,607	21.3	15,497	4.5	85,095	24.6
Negri Sembilan	258,381	13,231	5.1	56,460	21.9	17,168	6.6	69,691	27.0
Pahang	75,912	10,701	14.1	26,444	34.8	17,929	23.6	37,145	48.9
Total F.M.S. ...	975,288	46,000	4.7	227,365	23.3	65,572	6.7	273,365	28.0
UNFEDERATED MALAY STATES :—									
Johore	417,633	19,451	4.7	70,821	16.9	41,753	10.0	90,272	21.6
Kedah	199,180	3,880	1.9	22,423	11.3	19,349	9.7	26,303	13.2
Kelantan	28,891	403	1.4	12,489	43.2	7,688	26.6	12,892	44.6
Trengganu (*b*)	4,643	Nil	Nil	15	0.3	179	3.9	15	0.3
Perlis (*c*)	1,206	Nil	Nil	719	59.6	64	5.3	719	59.6
Brunei	(*d*) 4,991	Nil	Nil	1,588	31.8	856	17.2	1,588	31.8
Total U.M.S. ...	656,544	23,734	3.6	108,055	16.5	69,889	10.6	131,789	20.1
TOTAL MALAYA ...	1,836,221	75,876	4.1	393,916	21.5	140,245	7.6	469,792	25.6

Notes :—(*a*) Area out of tapping on Estates which have partly ceased tapping refers to areas definitely being rested and excludes areas on any tapping round.
(*b*) Registered Companies only.
(*c*) Rendered quarterly.
(*d*) Acreage of tappable rubber on 1st May, 1934.

STOCKS, PRODUCTION, IMPORTS AND EXPORTS OF RUBBER, INCLUDING LATEX, CONCENTRATED LATEX AND REVERTEX, FOR THE MONTH OF FEBRUARY, 1936, IN DRY TONS.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month			Consumption 3	
								during the month		January and Feb. 1936		during the month		January and Feb. 1936						
	Ports	Dealers	Estates of 100 acres and over	during the month	January and Feb. 1936	during the month	January and Feb. 1936	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	January and Feb. 1936
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
MALAY STATES :—																				
Federated Malay States ...	...	7,894	11,630	10,048	20,258	3,963	11,007	Nil	Nil	Nil	Nil	9,025	5,153	21,319	9,107	...	7,262	12,088	7	13
Johore ...	...	2,384	3,755	4,090	8,201	2,636	6,512	Nil	30	Nil	58	2,096	4,583	4,025	10,384	...	2,091	4,125	...	...
Kedah ...	...	386	2,947	2,318	5,697	624	1,129	Nil	Nil	Nil	Nil	1,140	1,841	2,585	4,512	...	220	3,074	...	...
Perlis ...	...	25	18	12	25	11	52	Nil	Nil	Nil	Nil	Nil	37	Nil	72	...	12	17	...	...
Kelantan ...	...	425	271	318	586	441	1,117	Nil	Nil	Nil	Nil	100	737	279	1,357	...	309	309	...	...
Trengganu ...	...	55	50	212	379	106	190	Nil	Nil	Nil	Nil	Nil	318	Nil	569	...	55	50	...	...
Brunei	...	8	47	47	100	67	134	...	...	...	...	...	113	...	231	...	17	39	...	...
Total Malay States	...	11,177	18,718	17,045	35,246	7,848	20,141	Nil	30	Nil	58	12,361	12,782	28,208	26,232	...	9,966	19,702	7	13
S. SETTLEMENTS :-																				
Malacca ...	...	2,331	1,147	1,004	2,117	454	1,208	Nil		Nil		1,935		4,535		...	1,758	1,203	...	...
Province Wellesley	...	1,357	499	380	840	221	463	Nil		Nil		7,747		15,962		...	772	497	...	...
Penang ...	2,246	6,138	11	16	34	56	97	3,046	10,891	5,590	23,278		Nil		Nil	2,696	6,020	10	...	...
Singapore ...	4,071	18,740	170	153	311	76	113	15,720		25,656		16,393		28,832		4,739	24,966	186	21	43
Labuan	...	13	Nil	Nil	Nil	17	29	91		193		Nil		Nil		...	15	Nil	...	...
Total Straits Settlements	6,317	28,579	1,827	1,553	3,302	824	1,910	18,857	10,891	31,439	23,278	26,075	Nil	49,329	Nil	7,435	33,531	1,896	21	43
TOTAL MALAYA	6,317	39,756	20,545	18,598	38,548	8,672	22,051	18,857	10,921	31,439	23,336	38,436	12,782	77,537	26,232	7,435	43,497	21,598	28	56

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
DRY RUBBER	6,416	24,312	5,853	2,258	.1814	130
WET RUBBER	846	654	167	304	277	90
TOTAL ...	7,262	24,966	6,020	2,562	2,091	220

TABLE III
FOREIGN EXPORTS

PORTS	For month	January and Feb. 1936
29	30	31
Singapore ...	23,649	45,904
Penang ...	10,810	22,047
Port Swettenham.	3,702	9,168
Malacca ...	275	418
MALAYA ...	38,436	77,537

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	January and Feb. 1936
32	33	34
Malay States ...	25,143	54,440
Straits Settlements	2,381	4,969
MALAYA ...	27,524	59,409

Notes:—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained.
2. The production of estates of less than 100 acres is estimated from the formula: Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month, + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Column (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication, therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S. and F.M.S., at Singapore on 25 March, 1936.

METEOROLOGICAL SUMMARY, MALAYA, FEBRUARY, 1936.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.	Mean of A and B.	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						Hrs.	Hrs.	
Railway Hill, Kuala Lumpur, Selangor ...	93.0	71.6	82.3	96	69	88	76	84.5	84.7	7.27	184.7	1.34	15	13	5	2	1	224.45	7.74	65
Bukit Jeram, Selangor ...	89.0	72.3	80.7	92	69	85	75	84.7	85.7	2.55	64.8	1.44	9	6	2	1		251.30	8.67	72
Sitiawan, Perak ...	89.8	73.4	81.6	93	69	85	77	83.7	83.8	4.38	111.3	3.08	10	8	2		1	217.25	7.49	63
Temerloh, Pahang ...	89.3	71.7	80.5	93	67	85	75	85.1	84.7	2.11	53.6	0.85	9	8	1	7		206.60	7.12	59
Kuala Lipis, Pahang ...	89.1	71.1	80.1	92	68	86	74	83.3	83.2	5.68	144.3	2.60	7	6	3	12		205.85	7.10	59
Kuala Pahang, Pahang ...	85.2	75.2	80.2	87	72	83	79	84.1	83.6	3.72	94.5	1.29	11	8				239.65	8.26	69
Kallang Aerodrome, S'pore ...	87.7	75.2	81.5	90	73	84	78	82.7	83.1	1.12	28.5	0.37	9	6	1			207.45	7.15	59
Butterworth, Province Wellesley ...	88.7	73.1	80.9	91	69	85	77	85.9	85.1	0.15	3.8	0.08	5	1				247.25	8.53	72
Bayan Lepas Aerodrome, Penang ...	89.1	73.1	81.1	92	67	85	76	84.3	84.0	1.02	25.9	0.32	6	5				231.85	7.99	67
Bukit China, Malacca ...	88.4	73.7	81.1	92	71	84	76	84.5	84.2	2.24	56.9	1.67	10	5	2			229.35	7.91	65
Kluang, Johore ...	88.3	71.3	79.8	92	68	80	74	81.0	81.3	7.25	184.2	2.32	13	11	2	7	2	194.45	6.71	55
Bukit Lalang, Mersing, Johore	83.7	72.6	78.1	87	69	82	77	80.5	79.9	1.72	43.7	1.27	4	3		1		230.20	7.94	66
Alor Star, Kedah ...	90.6	70.7	80.7	94	66	85	75	84.1	84.7	1.51	38.4	1.47	3	1	1	1		268.10	9.24	78
Kota Bahru, Kelantan ...	86.7	71.3	79.0	91	67	80	74	81.8	82.5	8.34	211.8	3.27	8	6		2		246.65	8.51	71
Kuala Trengganu, Trengganu	86.2	71.8	79.0	89	68	84	74	82.0	82.2	0.69	17.5	0.24	10	6		3		245.05	8.45	70
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	73.0	61.6	67.3	77	59	69	63	71.7	71.5	6.39	162.3	1.69	14	12	1	18		152.60	5.26	44
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	74.4	54.1	64.3	77	44	71	60	69.6	69.2	5.30	134.6	1.96	11	10				187.55	6.47	54
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	73.9	58.3	66.1	78	56	69	61			5.52	140.2	2.40	11	10				201.55	6.95	58

Compiled from Returns supplied by the Meteorological Branch, Malaya